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NINTH ANNUAL REPORT

—OF THE—

INSPECTOR OF MINES,

475-9

—OF THE—

✓  
STATE OF KENTUCKY,

OCTOBER 10, 1892.

✓  
CHARLES J. NORWOOD, Inspector.

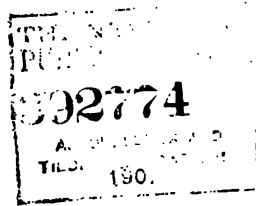
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## LETTER OF TRANSMITTAL.

---

*To His Excellency, JOHN YOUNG BROWN,*

*Governor of Kentucky:*

SIR : I have the honor of submitting herewith the Report of this Office, upon the mining interests of the State, for the year ending October 10, 1892.

I have been disappointed in the expectation of obtaining certain promised contributions for the Report, and my own time has been so completely filled with the routine work of the Office, that I have been unable to prepare as much special material as I would be glad to give. It is hoped, however, that the chapter entitled "Keys to the Coal Fields," with the accompanying vertical sections, in which may be found some matter hitherto unpublished, will prove useful to prospectors in our coal regions. This chapter has been prepared in recognition of the provision of the mining law, which authorizes the Inspector "to extend his observations so as to be prepared to report upon the mining possibilities and mineral resources of the counties to which he is called in the prosecution of his duties as Inspector."

I am indebted to Captain Geo. Gibbs for a paper on the coals of the Northeastern District, and to Mr. Jno. B. Atkinson for some notes on the comparative efficiency of the Campbell coal-washer. I am also indebted to Mr. Jno. G. Taylor, Treasurer, for a copy of Mr. Crandall's report on the Pineville region, made for the Pine Mountain Coal and Iron Company, (of which Mr. Taylor's company, the Southern Land Improvement Company, is successor), with permission to publish such parts as I deemed desirable; to Mr. F. A. Hull, President, for permission

to reproduce part of the special report on the Clear Creek region, Bell county, made by Mr. Crandall for the Log Mountain Coal, Coke and Timber Company; to Mr. Ben W. Robinson, for a copy of the St. Bernard Coal Company's bearing at Earlington, Hopkins county; and to Mr. John Ralston for a copy of his section of the coals showing in Mingo Mountain, in the southern edge of Bell county.

I take pleasure in acknowledging the courtesy of the mine operators in freely giving information upon certain statistical questions not covered by the law, whereby the statistical features of this Report have been made more satisfactory than those of any preceding one.

With the hope that the Report may receive your approval,

I have the honor to be,

Your obedient servant,

C. J. NORWOOD,

*State Inspector of Mines.*

# REPORT.

---

## I.

### PRELIMINARY.

It has been impossible to reach all the mines in operation during the year. A few, but only a few, have necessarily gone without inspection. This was due to the fact, simply, that the work of the office has grown to such proportions that it is beyond the powers of one man to efficiently perform all the duties devolving upon the Inspector. Attention was called to the necessity for an Assistant Inspector in the report for the year 1890, and again in that for 1891. In March of the present year a bill was introduced in the Senate by Hon. F. M. Hutcheson to provide for an Assistant Inspector, and it was duly passed by that body. It is now pending in the House, and I am hopeful that it will receive the favorable consideration of that body also. Should this hope prove well founded, I do not hesitate to promise that the work of the office will hereafter be performed more satisfactorily to all concerned, (to the present Inspector especially), than has been possible for two or three years past. At present, the Inspector can not do justice to the miners, the State, or himself ; he is struggling under a burden of overwork, which limits the effectiveness of his efforts in all directions.\*

---

\* Since the foregoing was written the bill providing for an Assistant Inspector has passed the House, where it was ably advocated by Hon. A. D. James, Hon. John D. Woods, Hon. T. S. Kirk and Hon. D. H. Severs, and it has received the approval of the Governor. Unfortunately, the Act does not take effect until ninety days after the adjournment of the Legislature.



**THE NUMBER OF MINES.**

There are now 148 commercial mines developed for working. Of these 122 were in operation during the year ending October 1st, hence under State supervision.

Of the large number of local mines, the position of which, with reference to inspection, varies with the seasons, eight are now subject to State supervision. There were, therefore, on October 1st:

Total commercial mines developed . . . . .	148
Total commercial mines idle . . . . .	26
Total commercial mines active . . . . .	122
Local mines subject to supervision . . . . .	8
Total mines subject to inspection . . . . .	130

This is an increase of 23 over the number subject to inspection on the same date in 1891.

There are at this date about 9,324 persons employed at the mines noted above, 7,517 of whom are engaged underground.

**FACTS IN BRIEF.**

Total mines producing during the calendar year 1891,	114
Shipping mines producing during calendar year 1891,	97
Bituminous output, in tons, for calendar year 1891..	2,907,096
Bituminous output, tons, for shipping mines for 1891,	2,864,473
Total cannel output for calendar year 1891, in tons..	43,040
Coke produced for calendar year 1891, in tons.....	32,693
Total available coke ovens, October 1, 1892.....	279
Maximum number of employes for calendar year 1891 .....	8,683
Average number of employes for calendar year 1891..	6,422
Total fatalities for calendar year 1891.....	16
Tons of product raised per death, for calendar year 1891 .....	184,312
Tons of product raised per inside death, for year 1891 .....	226,933
Total mines producing during last half of 1891.....	109
Shipping mines producing during last half of 1891..	91

Bituminous output, in tons, for last half of 1891.....	1,522,076
Output bituminous shipping mines last half of 1891, in tons.....	1,496,645
Cannel output for last half of 1891, in tons .....	22,796
Coke produced for the last half of 1891, in tons.....	22,927
Maximum number of employes for last half of 1891..	7,895
Average employes for last half of 1891 .....	6,716
Inside fatalities for last half of 1891 .....	8
Total mines producing for first half of 1892 .....	118
Shipping mines producing for first half of 1892.....	105
Bituminous output for first half of 1892, in tons.....	1,330,980
Output of bituminous shipping mines, first half of 1892, tons.....	1,324,240
Output of cannel mines for first half of 1892, in tons..	23,965
Coke produced for first half of 1892, in tons.....	18,600

## II.

### GENERAL CONDITION OF THE MINES, ETC.

With a few notable exceptions, there has been a marked tendency towards better methods of ventilation during the past year, and in the direction of proper drainage some progress has been made. There have, however, been too many accidents from falls off roof, indicating the necessity for the exercise of greater care in the general underground management. Although the inside accident rate and the inside death rate for 1891 are lower than the same rates for 1888 and 1889, they are higher by a small per cent. than for the year 1890. It is believed that this might have been, to a certain extent, prevented, had it been possible for this office to have given more frequent attention to certain of the mines. In the Inspector's behalf it must be said that the number of mines to be visited jumped from 81, in 1890,

to 114, in 1891, with a corresponding increase of office duties, and, without clerical or other assistance of any kind, it was simply beyond his physical powers to examine all the mines as often as he deemed necessary.

A comparison of the rates for the fiscal years 1891 and 1892, however, yields more satisfactory results. There were fewer fatal and serious accidents in 1892, although more persons were employed and a larger tonnage of product raised. The number of tons of product raised per inside "fatal and serious" accident in 1892 was 107,400, against 78,422 for the year ending June 30, 1891. The tons raised per inside death were 362,477 against 249,524. The maximum number of persons employed inside per "fatal and serious" accident inside was 260, against 173.97; and the maximum number employed inside per death inside was 912.75, against 553.54 in the fiscal year 1891.

The following tables present the casualty statistics somewhat in detail: \*

#### CALENDAR YEAR 1890.

Accidents inside. . . . .	82
Deaths inside. . . . .	9
Mines, both bituminous and cannel. . . . .	81
Tons of product raised. . . . .	2,532,526
Accidents inside per mine. . . . .	0.3959
Deaths inside per mine. . . . .	0.1111
Product raised per accident inside. . . . .	79,141.4
Product raised per death inside. . . . .	281,391.8

#### CALENDAR YEAR 1891.

##### FATALITIES.

DISTRICT.	1ST SIX MONTHS.			2D SIX MONTHS.			TOTAL FOR YEAR.		
	Inside.	Out.	Total.	Inside.	Out.	Total.	Inside.	Out.	Total.
Western . . . . .	2	1	3	2	1	3	4	2	6
Southeastern . . . .	2	. . .	2	1	1	2	3	1	4
Northeastern . . . .	1	. . .	1	5	. . .	5	6	. . .	6
Totals . . . . .	5	1	6	8	2	10	13	3	16

\*For further details see Topic V, entitled "Accidents."

The accident and death rates were as follows:

Total noteworthy accidents . . . . .	43
Noteworthy accidents inside . . . . .	39
Total deaths . . . . .	16
Deaths inside . . . . .	13
Mines, both bituminous and cannel . . . . .	114
Maximum persons employed . . . . .	8,688
Maximum persons inside . . . . .	7,031
Tons of product raised . . . . .	2,950,136.84

*The percentages were, therefore:*

Noteworthy accidents, per mine . . . . .	0.3771
Noteworthy accidents inside, per mine . . . . .	0.3421
Deaths, per mine . . . . .	0.14035
Deaths inside, per mine . . . . .	0.11403
Tons raised per inside accident . . . . .	75,644.58
Tons raised per death . . . . .	184,321
Tons raised per inside death . . . . .	226,983
Maximum persons per accident . . . . .	201.93
Maximum persons inside per inside accident . . . . .	180.28
Maximum persons employed per death . . . . .	542.68
Maximum persons inside per death inside . . . . .	540.84

All but three of the thirteen inside fatalities were due to falls of slate. The evidence seems unquestionable that sufficient attention is not paid to the matter of propping, and observation shows that the failure to prop is by no means to be laid entirely to the charge of the "careless" miner. When the roof along entries, for the condition of which the miner is in nowise responsible, is not kept in good order, but, on the contrary, is allowed to go unscaled or untimbered up to the "last moment," long after dangerous conditions have appeared—as has frequently been noted—a looseness of management is indicated which militates against the validity of the explanation, "carelessness of the miner," so often given for accidents which have occurred in the rooms. The difficulties in the way of enforcing mine rules are not underestimated, but the writer believes that wise rules and more diligent attention to the condition of the roof on the part of the mine officials would materially reduce the percentage of casualties due to falls of top. A system of examination, by a mine official or special inspector, of the roof in rooms opened in those parts of the mine where "bad top" has been encountered, before the miners enter in the morning, would certainly give good results.

## YEAR ENDING JUNE 30, 1892.

## FATALITIES.

DISTRICT.	Six Months to December 31, 1891.			Six Months to June 30, 1892.			Year to June 30, 1892.		
	Inside . .	Outside .	Total . .	Inside .	Outside .	Total . .	Inside . .	Outside .	Total . .
Western . . . . .	2	1	3	. . .	1	1	2	2	4
Southeastern . . .	1	1	2	. . .	. . .	. . .	1	1	2
Northeastern . . .	5	. . .	5	. . .	. . .	. . .	5	. . .	5
Totals . . . . .	8	2	10	. . .	1	1	8	3	11

The single death reported for the first half of the present year occurred near the mouth of a slope mine, and was caused by the ascending cars. It could not have been prevented. It will be observed that there were no fatalities inside, and it may be stated that there were only ten serious accidents inside during the first six months of 1892; which speaks well of the condition of the mines for that period.

The statistics for the fiscal year are as follows :

Total noteworthy accidents . . . . .	44
Total noteworthy accidents inside . . . . .	40
Total serious accidents . . . . .	20
Total serious accidents inside . . . . .	19
Total fatalities . . . . .	11
Total fatalities inside . . . . .	8
Total fatal and serious accidents . . . . .	31
Total fatal and serious accidents inside . . . . .	27
Mines, bituminous and cannel . . . . .	123
Maximum employes . . . . .	9,072
Maximum employes inside . . . . .	7,032
Tons of product raised . . . . .	2,899,818.53

*The rates were, therefore :*

1. Serious accidents per mine . . . . .	0.16260
Serious accidents inside per mine . . . . .	0.15447
Tons raised per serious accident . . . . .	144,990
Tons raised per serious inside accident . . . . .	152,622
Maximum persons per serious accident . . . . .	453.60000
Maximum persons inside per inside serious accident . . . . .	370.19

2. Fatal and serious accidents per mine . . . . .	0.2520
Fatal and serious accidents inside per mine. . . . .	0.21951
Tons raised per fatal and serious accident . . . . .	93,542
Tons raised per fatal and serious accident inside . . . . .	107,400
Maximum persons per fatal and serious accident . . . . .	292.64
Maximum persons inside per fatal and serious accident inside . . . . .	260.00
8. Deaths per mine . . . . .	0.0894
Inside deaths per mine. . . . .	0.06504
Tons raised per death . . . . .	263,619
Tons raised per inside death . . . . .	362,477
Maximum persons per death . . . . .	824.72
Maximum persons inside per inside death . . . . .	912.75

The following table exhibits, for comparison, the inside casualty and death rates for the past four years :

#### CASUALTY AND ACCIDENT RATES BY PERIODS.

Page 9.—For "Casualty and Accident Rates by Periods," at head of the Table, read "Casualty and Fatality Rates," etc.

	Per .	Inside mine.	In- .	inside .	Ac- in- .	In- death. .
Calendar year 1888.	0.5584	0.1818	55,453.3	170,342.3	...	...
Calendar year 1889.	0.5000	0.1463	54,786.7	187,188.2	...	...
Calendar year 1890.	0.3950	0.1111	79,141.4	281,391.8	...	...
Calendar year 1891.	0.3421	0.1140	75,644.53	226,933	180.28	540.84
Year ending June 30, 1890 . . . . .	0.4210	0.131	74,390.1	238,048.0	185.8	434.6
Year ending June 30, 1891 . . . . .	0.3888	0.122	78,422.0	249,524.5	173.97	553.54
Year ending June 30, 1892 . . . . .	0.1544	0.0650	152,622	362,477	370.10	912.75

#### IMPROVEMENTS.

Noteworthy improvements, or additions to equipment, which are stated in detail elsewhere, have been made at the following mines during the year ending June 30, 1892: Aberdeen, Barnaby, Corydon, DeKoven, Davidson's, Deaneffeld, Empire, Echols, St. Bernard Company's at Earlington, Gaines & Read's, Hecla, Nall's, Madisonville, Memphis, Mud River, McHenry,

Oak Hill, Pierce, Render, Sturgis, Taylor, Williams, Wardlaw, in the Western District; Alpine, Barren Fork, Dowlais, Main Jellico Mountain, North Jellico, Star, Southern Land Improvement Company's, Strunk's Lane, in the Southeastern District; Ashland Coal and Iron Railway Company's, Lost Creek, Great Western Mining and Manufacturing Company's, and White House, in the Northeastern District.

#### **SAFETY DEVICES.**

During the inspection year, safety-cages were procured, in accordance with instructions given, at the mines of J. L. Nall, in Daveiss county, and of B. C. Davidson & Sons, in Union county. P. J. McNamara was presented to the grand jury for failure to comply with repeated notices to apply safety-catches to the cages of his mine, in Henderson county.

#### **VENTILATION.**

Furnaces have been built at the Annie Mine of the Great Western Mining and Manufacturing Company, in Lawrence county; at the Lost Creek Mine of the Eastern Kentucky Railway Company, in Carter county, and at the Dowlais Mine (an additional one) of the East Tennessee Coal Company, in Whitley county.

Fans have been erected at the Sturgis Mine of the Sturgis Coal and Coke Company, in Union county; at the Hecla Mine (operated by electricity) of the Hecla Coal and Mining Company, in Hopkins county, and at the Strunk's Lane Mine of the Pine Knot Coal Company, in Pulaski county. With the addition of these, there are now 22 fans in use. The progress in the use of fans, indicated by the number erected each year, has been as follows: 1885, 1; 1886, 2; 1887, 4; 1888, 4; 1889, 1; 1890, 4; 1891, 3; 1892, 3. Total, 22. Although the necessity for their use is greater in the Eastern Field than elsewhere, in consequence of the shallowness of the ventilating shafts, there are but five fans in operation there. As between a fan and a furnace for ventilating the mines of this Field, upon the questions of results obtained, economy and convenience, there is no room for serious argument, yet the operators—who, generally, were adherents to “natural means” for ventilation until it was

prohibited by law—are, most of them, reluctant to abandon the use of furnaces. That this may be due somewhat to the fact that steam is used at comparatively few of the mines in that Field, is not overlooked; but even were it necessary to provide steam especially for them, the ultimate expense for fans would still be less than for furnaces. Not infrequently, the bottom cause of defective ventilation noted at mines in this Field, is lack of power at the ventilating shaft.

#### **DRAINAGE.**

A poorly drained mine is an exception in the Western Field. The reverse is true of the Eastern one. In the one Field pumps are generally used; in the other, a pump is seldom found. It should be stated, however, that notable progress has been made towards better drainage in both of the Eastern Districts; and there is reason to hope, since the delusion that a coal "above drainage" will afford a dry mine has been dispelled, that in future operations in these Districts the question of drainage will receive due attention.

#### **MINE HAULAGE.**

The tail-rope system of mine haulage has been introduced at the Dowlais Mine, in Whitley county. At the Hecla Mine, in Hopkins, the electric motor, introduced in the latter part of 1891, has given satisfaction, notwithstanding many early discouragements. The rope system at the McHenry Mine, in Ohio county, has been extended.

#### **MINING BY MACHINE.**

The North Jellico Coal Company, Knox county, has added four Harrison machines to its plant. At the Alpine Mine of the Richmond Coal Company, in Pulaski county, two Ingersoll-Sergeant machines have been introduced, and at the Sturgis Coal and Coke Company's Mine in Union county four Ingersoll-Sergeant machines are used. Practically all the coal produced at the Hecla Mine is mined by electricity, six Sperry machines being in use. The St. Bernard Coal Company has been using the Harrison machine at its Earlington and St. Charles Mines for several years; the Barren Fork Mining and Coal Company has been using the Jeffrey; the Great Western Mining and Man-



Manufacturing Company has used both the Harrison and the Jeffrey machines, at its Peach Orchard mines, (all machines now, however, being of the Harrison pattern, it is believed); and at the Reinecke Mine the Ingersoll-Sergeant machine is in use.

#### MISCELLANEOUS NOTES.

*Falls of Roof.*—A system of examination of the roof of the rooms, before the men enter in the morning, would greatly tend to diminish the chance of injury from falls of top. I am satisfied that several accidents, which occurred during the past year from falls of roof, would have been avoided had such a system been in operation.

*Maps.*—Effort to secure compliance with the law concerning mine maps is one of the most trying duties of the Inspector. Two maps a year are doubtless a burden on some operators, without being of any particular advantage to the Inspector; this is especially true of those mines where maps are made, not because the operators themselves realize the necessity for maps, in order that the mine may be worked to the best advantage, but simply because the law requires them. Maps from such mines are usually imperfect—not infrequently quite erroneous—and are delayed until the last moment. The provision in the law as revised by the Revisory Commission, whereby maps are required only once a year, within sixty days after January 1st, will doubtless prove satisfactory to all concerned.

*Small Air-ways.*—One great evil still to be observed in the management of many of our mines, is the smallness of the air-ways. Attention has been repeatedly called to the fact that unless the air-ways are of ample size, and are kept clear of debris, adequate ventilation can not be obtained, without the expenditure of more power than is usually provided. Moreover, that should the power be supplied with small air-ways, too high a velocity is required for the obtention of a sufficient volume. A small air-way requires a greater ventilating pressure, hence greater horse-power, than a large one. More attention should be paid to this question.

*Friction in the Mine.*—There is too great a tendency to expect the same power that served to produce ventilation when the mine was first opened, or but little developed, to continue to answer after large areas have been excavated. The fact is

not taken into consideration that as the excavations are increased the friction is increased—that it is the resistance thus offered which makes necessary the production of ventilation by some power. The question of the friction of air in mines has not received the consideration in this State which is necessary in order to manage the ventilation in an intelligent and successful way. Attention to this was called in my first Report.

Unless we keep in mind the fact that the chief reason why we use a fan or a furnace in a mine is because we must have some power to force the air along against the resistance to its passage offered by the surfaces of the excavations—i. e., some power to overcome the resistance offered by the “brake”—and that the resistance, or friction, increases or decreases as the amount of surface is increased or decreased, our efforts at ventilation are wholly carried on in a blind way. It should be remembered that: (a). It requires more power to ventilate a mine when the air is sent through the rooms, than when merely sent along the entries. (b). It requires more power when the break-throughs between rooms are irregular, than when kept in orderly succession—in an even line. (c). The power required may be reduced by cutting off old works. Hence the advantage of working the coal out in sections, in some cases, and shutting off the worked-out spaces.

*Poor Oil.*—Poor oil is one of the potent causes of “bad air” in many of our mines. A law requiring the use of only good oil would doubtless be beneficial.

*Drainage.*—“Swags” are allowed to interfere too much with the drainage of many of the mines, especially in the Eastern Field. Fruitless efforts to make the water drain to the mouth of the bank, in the Eastern drift mines, cost more than a pumping plant, in the end. Sufficient work has been done in this Field, to demonstrate that, contrary to the impression made by the fact that the coals are usually “above drainage,” it is folly to undertake mining operations on a considerable scale without the use of pumps. Some of the mines, high up in the mountains, of the Eastern Field are wetter than many of the shafts of the Western District. The rocks above the coals are like sponges, the roof-rock is very permeable, and the mines fill with water the year round.

*Crushes.*—Several crushes which have been noted within the past year were caused by poor drainages, as well as by thin pillars. The accumulated water acts upon the pyrites in the floor and coal, and brings on creeps.

*Available Air.*—When a mine is ventilated by a single current, or in the case of a split which has to furnish air for more than one entry, the amount of air required for each successive entry entered by the current, plus the total amount required for preceding entries, must be subtracted from the total volume traveling to obtain the amount available for the particular entry in question. The amount left, after subtracting what was needed for preceding entries, is the "available air" for the particular entry in question. This explanation is given for the benefit of those who may have failed, or who may hereafter fail, to understand the use of the expression in the Inspection Notices served upon them.

*"Cheap Coal."*—Observations of the past year show that in some parts of the coal fields, especially in the Eastern one, too much "gouging" is done (and too little attention paid to drainage), in order to get "cheap coal." There is too great a tendency to assume that a certain piece of coal *must* be worked "just any way"—the "best way we can"—to get it, on account of "swags." But it is *not* the "best way," and the consequence is a butchered piece of work; lost coal, because of crushed pillars, or falls of top; wretched conditions for the miner to work under, with respect both to air and drainage; and, in the end, most costly coal. The secret of this, occasionally, is the manager's desire to get a large output, at a small cost, during his term, without regard to the future. He does not expect to remain after the evil effects of his policy begin to appear, and "costly coal" comes in; he expects to let his successor bear the odium of costly coal. His successor may contend with the miserable drainage, the crushing pillars, the caving roof, lost rooms, etc., and endeavor to recover the lost blocks, and just when success is about to smile upon his efforts, "the Directors" oust him because he is "too costly." "Everything is not gold" that comes from a mine, and the sooner this is properly recognized at the "business end" of the mining company, the better it will be for all interests concerned.

### III.

#### STATISTICAL INFORMATION.

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[NOTE: The output of only such mines as are of commercial importance (shipping and those locally important on account of partly supplying points that are open to the shipping mines) is reported here.]

In the Report of this office for 1891, the following statement occurs:

“To what extent Kentucky’s value, as real estate, is annually depreciated by the removal of coal, can not be accurately stated, in consequence of the impossibility, with present facilities, of determining the tonnage raised at the innumerable small banks scattered through both coal fields.”

Enough is known, however, to warrant the belief that some of the statements of total production published by statisticians at a distance have been exaggerated. The tendency of such statisticians—unfamiliar with the details of the State, and unmindful, if cognizant, of the large forest areas of the coal fields—to add a certain per cent. to the known output, in order to cover the unknown, has been misleading. It is safe to say that at this time, with a larger proportion of the rural population using coal than ever before, with more coal used in the smaller towns within the wooded districts than ever before, it is probable that the total annual tonnage of the State (including the product of neighborhood and family banks) does not exceed that reported by this Office by more than 200,000 or 250,000 short tons.

But the great desirability of trustworthy statistics, showing the actual tonnage of coal produced by all regions, is becoming more distinctly apparent each year. It would be well, therefore, until better arrangements may be made, were this Office authorized to secure, each year, an agent, in every coal county, to gather statistics relating to the tonnage of the small banks that can not now be reached by any means at the Inspector’s command.

Although the total of the highest estimates that have been made, for all the years, indicates the removal of only an infinitesimal part of the State's supply of workable coal, the growth of the output of commercial mines has in recent years been rapid; and this is one of the most encouraging, as it is one of the most definite, signs of the State's actual progress towards the industrial position it is confidently expected to hold in the near future. For, while the removal of a ton of coal for household purposes alone indicates simply the depletion, by that much, of the store of fuel, the production of commercial coal carries with it an augmentation of population, a growth of other industries, and an increase of local prosperity.

It is, perhaps, not too much to say that, notwithstanding its great agricultural resources, its splendid forests, its fine quarries, its wealth in valuable clays, the possibilities of its petroleum districts and its iron ore regions, the surest guarantee of the State's future prosperity is its wonderful wealth of coal. The recognition of this fact is indicated by the efforts of organized capital, in the form of "syndicates," to secure control of large bodies of our coal lands while they are yet cheap.

#### OUTPUT OF BITUMINOUS COAL FOR 1891.

The total output of bituminous coal for the calendar year 1891, 109 mines (of the classes the output of which is reported by this Office) producing, amounted to 72,677,421 bushels (2,907,096 short tons), of which 38,051,919 bushels were produced, by 103 mines, during the last half of the year. This was an increase of 10,598,812 bushels (423,952 tons) over 1890—the largest increase within a single year since the development of mining as an "industry" in this State.

In the production of this coal a maximum of 8,315 persons were employed, the average number being 6,144.

Following is a summary relating to the last half of the year:

**SIX MONTHS ENDING DECEMBER 31, 1891.**  
**OUTPUT OF COAL IN BUSHELS OF 80 POUNDS.**

District.	SHIPPING MINES.				NON-SHIPPING MINES.		TOTALS.	
	Number . . . . .	Lump . . . . .	Other Grades. . . . .	Total . . . . .	Number . . . . .	Total Product . . . . .	Number Mines . . . . .	Product . . . . .
Western . . . . .	43	9,173,018	10,940,183	20,113,201	16	605,776	59	20,718,977
Southeastern . . . . .	28	4,488,176	7,448,857	11,937,033	1	80,000	29	11,967,083
Northeastern . . . . .	15	3,072,062	2,298,847	5,365,909	. . . . .	. . . . .	15	5,365,909
Totals . . . . .	86	16,733,256	20,682,887	37,416,143	17	685,776	103	38,051,919



The consolidated output of the Districts for the calendar year was as follows :

## CALENDAR YEAR 1891.

## OUTPUT IN BUSHELS OF 80 LBS.

GRADE.	From 92 Shipping Mines.	From 17 Non-shipping Mines.	Total from 109 Mines.
Lump . . . . .	31,260,250½	422,147½	31,682,398
Nut . . . . .	8,866,106½	107,029	8,973,135½
Run of Mines . . . . .	10,870,405¾	159,113	10,529,518¾
Slack . . . . .	4,619,328	66,586	4,685,909
Mixed Lump and Nut . .	12,059,445½	282,500	12,341,945½
Pea . . . . .	2,274,726½	28,207	2,302,932½
Miscellaneous . . . . .	2,161,588	. . . . .	2,161,588
Totals . . . . .	71,611,839½	1,065,582½	72,677,421½

The number of employes was as follows :

	For 92 Shipping Mines.			For 17 Non-shipping Mines.			For 109 Mines, Totals.		
	In.	Out.	Total.	In.	Out.	Total.	In.	Out.	Total.
Maximum number.	6,592	1,521	8,113	149	53	202	6,741	1,574	8,315
Average number . .	4,919	1,093	6,012	108	29	132	5,022	1,122	6,144



The output by Districts, in bushels of eighty pounds, was as follows :

**WESTERN DISTRICT.**

[CALENDAR YEAR 1891.]

GRADE.	From 45 Shipping Mines.	From 16 Non-shipping Mines.	Total from 61 Mines.
Lump . . . . .	16,957,187½	422,147½	17,379,285
Nut . . . . .	4,921,072	107,029	5,028,101
Run of Mines. . . . .	3,830,536	159,113	3,989,649
Slack. . . . .	2,528,699	66,586	2,595,285
Mixed Lump and Nut . .	7,982,070	252,500	8,234,570
Pea . . . . .	1,074,358	28,207	1,102,565
Miscellaneous . . . . .	1,456,798	. . . . .	1,456,798
Totals . . . . .	38,750,670½	1,085,582½	39,786,253

The output of this District exceeded the amount reported for 1890 by 7,291,318 bushels. The increase for the shipping mines amounted to 6,970,917 bushels.

The number of employes was as follows :

	For 45 Shipping Mines.			For 16 Non-shipping Mines.			Total for 61 Mines.		
	In.	Out.	Total.	In.	Out.	Total.	In.	Out.	Total.
Maximum . . . . .	3,097	785	3,882	141	52	193	3,238	837	4,075
Average . . . . .	2,420	612	3,032	95	28	123	2,515	640	3,155

## SOUTHEASTERN DISTRICT.

[CALENDAR YEAR 1891.]

GRADE.	For 31 Shipping Mines.	For 1 Non- shipping Mine.	Total for 32 Mines.
Lump . . . . .	7,809,598½	. . . . .	7,809,598½
Nut . . . . .	2,568,924½	. . . . .	2,568,924½
Run of Mines. . . . .	4,694,618¾	. . . . .	4,694,618¾
Slack . . . . .	1,252,295	. . . . .	1,252,295
Mixed Lump and Nut . .	4,083,256½	30,000	4,063,256½
Pea . . . . .	849,790½	. . . . .	849,790½
Miscellaneous . . . . .	543,242	. . . . .	543,242
Totals . . . . .	21,751,725½	30,000	21,781,725½

The output of this District exceeded that reported for 1890 by 3,633,797 bushels. The increase for the shipping mines amounted to 3,638,097 bushels.

The number of employes was as follows :

	For 31 Shipping Mines.			For 1 Non- shipping Mine.			Total for 32 Mines.		
	In.	Out.	Total.	In.	Out.	Total.	In.	Out.	Total.
Maximum . . . . .	2,806	536	2,842	8	1	9	2,814	537	2,851
Average . . . . .	1,589	342	1,931	8	1	9	1,597	343	1,940

## NORTHEASTERN DISTRICT.

[CALENDAR YEAR 1891.]

GRADE.	From 16 Shipping Mines.
Lump . . . . .	6,493,514½
Nut. . . . .	1,376,110
Run of mines. . . . .	1,845,251
Slack . . . . .	838,329
Mixed Lump and Nut . . . . .	44,119
Pea . . . . .	350,577
Miscellaneous . . . . .	161,543
Totals. . . . .	11,109,443½

The output of this District was less than that reported for 1890 by 326,303 bushels.

The number of employes was as follows :

	Inside.	Outside.	Total for 16 Mines.
Maximum . . . . .	1,189	200	1,389
Average . . . . .	910	139	1,049

The output of shipping mines tabulated according to transportation routes was as follows :

**BITUMINOUS MINES.**  
**OUTPUT OF SHIPPING MINES ON RAILROADS.**  
**[CALENDAR YEAR 1891]**

DISTRICT	COUNTY.	Mines.	RAILROADS.	Total Bush-els.	Bushels of Lump.
stern . . .	Christian . . .	1	Henderson & Nashville Division of L. & N. System . . . . .	829,875	534,666
	Daveiss . . .	1	Louisville, St. Louis & Texas . . . . .	12,000	10,500
	Henderson . . .	2	Louisville, St. Louis & Texas . . . . .	2,161,505	1,494,668
	{	1	Providence Branch L. & N. System . . . . .	2,189,524	1,012,577
		8	Henderson & Nashville Division L. & N. System . . . . .	10,201,634	8,436,488
	Hopkins . . .	2	Newport News & Mississippi Valley (C., O. & S. W.) . . . . .	4,198,510	2,019,964
	{	1	Owensboro & Nashville Division L. & N. System . . . . .	459,056	212,772
		4	Newport News & Mississippi Valley (C., O. & S. W.) . . . . .	3,474,399	1,896,128
	McLean . . .	4	Owensboro & Nashville Division L. & N. System . . . . .	3,046,831	1,125,316
	Muhlenberg . . .	2	Louisville, Hardinsburg & Western . . . . .	162,075	225,818
	{	2	Owensboro, Falls of Rough & Green River . . . . .	878,314	3,322,586
		4	Newport News & Mississippi Valley (C., O. & S. W.) . . . . .	7,892,355	964,499
	Union . . .	6	Ohio Valley . . . . .	2,071,445	412,544
	Webster . . .	2	Providence Branch L. & N. System . . . . .	814,829	15,657,381
	Totals . . .	40		37,892,352	
Southeastern . . .	Bell . . .	*4	Cumberland Valley Branch L. & N. System . . . . .	819,271	36,285
	Knox . . .	1	Cumberland Valley Branch L. & N. System . . . . .	2,776,772	937,406
	Laurel . . .	16	Knoxville Branch L. & N. System . . . . .	7,621,758	2,740,279
	Pulaski . . .	4	Cincinnati Southern . . . . .	2,840,411	194,100
	Rockcastle . . .	2	Knoxville Branch L. & N. System . . . . .	243,716	30,053
	{	1	Cincinnati Southern . . . . .	224,984	3,871,475
		4	Knoxville Branch L. & N. System . . . . .	7,224,862	
	Totals . . .	31		21,751,724	7,809,598

\*One of these Mines is on the West Va., Pineville & Tennessee, but that short line is operated by the C. V. Branch.

## BITUMINOUS MINES--Continued.

DISTRICT.	COUNTY.	Mines.	RAILROADS.	Total Bush-els.	Bushels of Lump.
Northeastern.	Boyd . . . . .	2	Newport News & Mississippi Valley (E. Division) . . . . .	4,457,485	2,870,832
	Breathitt . . . . .	1	Kentucky Union . . . . .	270,060	52,102
	Carter . . . . .	2	Eastern Kentucky . . . . .	269,787	98,185
	Lawrence . . . . .	7	Newport News & Mississippi Valley (E. Division) . . . . .	8,804,111	1,719,820
	Menefee . . . . .	2	Ohio & Big Sandy . . . . .	2,273,050	1,752,575
	Menefee . . . . .	2	Kentucky & South Atlantic . . . . .	35,000	.....
Totals . . . . .		16		11,109,443	6,493,514

## SUMMARY.

DISTRICTS.	No. of Mines.	Total Product in Bushels.	Bushels of Lump.
Western . . . . .	40	37,892,352	15,657,381
Southeastern . . . . .	31	21,751,724	7,809,598
Northeastern . . . . .	16	11,109,443	6,493,514
Totals . . . . .	87	70,743,519	29,960,493

**OUTPUT BY COUNTIES.**

The following table exhibits the output, in bushels of 80-pounds, of bituminous coal by counties, for the calendar year 1891; and also the gain or loss of product for each county, compared with the returns for 1890.

It is worthy of note that two counties alone—Hopkins in the West, and Whitley (or Laurel) in the East—jointly produced more “commercial” coal than the product of the entire State—amounted to in 1880, according to the returns of the United States Census Bureau for the latter year. Also, that while the total number of persons reported as employed at the mines for the entire State in 1880 was only 2,826, more than three times that number (8,683) were employed in the mines subject to inspection, alone, in 1891. The number now employed in the State must range between 11,000 and 12,000 :

[CALENDAR YEAR 1891.]

COUNTIES.	Bushels for 1891.	Bushels for 1890.	Gain for 1891.	Loss for 1891.
Bell. . . . .	819,271	598,519	225,752	. . . . .
Boyd . . . . .	4,457,435	4,588,023	. . . . .	130,588.
Breathitt . . . . .	270,060	13,255	256,805	. . . . .
Butler . . . . .	288,675	44,668	244,007	. . . . .
Carter . . . . .	4,073,898	4,943,358	. . . . .	869,460.
Christian. . . . .	840,875	673,497	167,378	. . . . .
Clay . . . . .	30,000	. . . . .	30,000	. . . . .
Crittenden . . . . .	55,800	62,900	. . . . .	7,100.
Daveiss . . . . .	415,497	184,278	231,219	. . . . .
Hancock . . . . .	38,000	. . . . .	38,000	. . . . .
Henderson . . . . .	2,628,395	1,774,341	854,054	. . . . .
Hopkins . . . . .	16,864,313	14,072,194	2,792,119	. . . . .
Knox . . . . .	2,776,772	2,002,637	774,135	. . . . .
Laurel . . . . .	7,621,758	6,039,889	1,581,869	. . . . .
Lawrence . . . . .	2,273,050	1,889,110	383,940	. . . . .
McLean . . . . .	587,739	426,659	161,080	. . . . .
Menefee . . . . .	35,000	. . . . .	35,000	. . . . .
Muhlenberg . . . . .	6,626,646	5,777,004	849,642	. . . . .
Ohio . . . . .	8,437,844	6,794,276	1,643,568	. . . . .
Powell . . . . .	. . . . .	2,000	. . . . .	2,000.
Pulaski . . . . .	2,840,412	2,461,968	378,444	. . . . .
Rockcastle . . . . .	243,716	40,453	203,263	. . . . .
Union . . . . .	2,187,640	1,713,466	474,174	. . . . .
Webster . . . . .	814,829	971,652	. . . . .	156,823.
Whitley . . . . .	7,449,796	7,009,462	440,334	. . . . .
Totals . . . . .	72,677,421	62,078,609	11,598,812	1,165,971

The net gain amounted to 10,598,812 bushels. It will be ob-

served that 1,000,048 bushels of the total loss are chargeable to the decrease of output of Boyd and Carter counties.

#### OUTPUT FOR THE FIRST HALF OF 1892.

The output of bituminous coal for the first half of the present year fell 1,067,134 bushels below that for the same period of 1891, although there were 29 more mines in operation. The loss was sustained nearly altogether in the Eastern Field, especially in the Southeastern District. The Western District shows a gain of 844,315 bushels.

Following is a summary of the output in bushels for the six months ending June 30, 1892 :

#### SIX MONTHS ENDING JUNE 30, 1892.

DISTRICT.	Shipping Mines.		Non-shipping Mines		Totals.	
	No. of Mines.	Product.	No. of Mines.	Product.	No. of Mines.	Product.
Western . . . . .	51	19,507,786	11	137,500	62	19,645,286
Southeastern . . . .	33	8,672,597	1	30,000	34	8,702,597
Northeastern . . . .	15	4,925,680	1	1,000	16	4,926,680
Totals . . . . .	99	33,106,013	13	168,500	112	33,274,513

In the Southeastern District the output of the shipping mines is 1,142,095 bushels less than that for the same period in 1891. The falling off occurred principally in Knox and Laurel counties (amounting for those two counties to 1,241,740 bushels), where a strike occurred, lasting through May and June. Pulaski county shows a falling off of 311,845 bushels, due to the stoppage of the Greenwood and Alpine mines for four and two months respectively. Whitley, Rockcastle and Bell counties show a total increment of 409,490 bushels, although dull trade towards the South—due to the shutting down of iron furnaces and consequent deflection of furnace fuel to the general market—limited the output, of Whitley especially, to figures below what had been expected.

Every county in the Northeastern District, save Menefee, shows a falling off, the net decrement amounting to 799,355 bushels. No general cause may be assigned for the falling off in this District. For the old mines alone there was a net loss of 1,031,190 bushels. The total decrement of their output amounted to 1,271,647 bushels, of which 1,144,767 bushels are attributable to losses at four mines, the reason for the loss at each mine being peculiar to that mine.

The following table exhibits the output in full for this period, by Districts :



**BITUMINOUS MINES.**  
**OUTPUT OF SHIPPING AND IMPORTANT LOCAL MINES.**  
**FOR SIX MONTHS ENDING JUNE 30, 1892.**

District.	No. of Mines.	Total, all Kinds.	OUTPUT IN BUSHELS OF 80 POUNDS.					Pea.	Miscellaneous.	Total Tons.
			Lump.	Nut.	Run of Mines.	Slack.	Mixed Lump and Nut.			
Western. . .	62	19,645,286	7,698,497	2,195,848	2,516,279	1,315,658	4,520,760	433,063	970,131	785,809.44
Southeastern	34	8,702,597	2,802,744	956,923	2,060,912	511,607	1,787,881	238,280	349,250	348,103.88
Northeastern	16	4,926,680	2,452,271	488,982	1,199,804	373,640	169,919	127,408	114,656	197,067.20
Totals . .	112	33,274,513	12,948,512	3,641,753	5,776,995	2,200,905	6,478,560	798,751	1,434,037	1,380,980.52
Equivalent Tons.		1,380,980.52	517,940.48	145,670.12	231,079.80	88,036.20	259,142.40	31,750.04	57,361.48	. . . . .

Of the product included in this Table, 168,500 bushels, all "mixed lump and nut," were produced by 13 small, non-shipping mines, as follows: *Western District*—Daveiss county (8 mines), 128,000; Christian county (1 mine), 2,000; Hancock county (1 mine), 7,500; total, 137,500. *Southeastern District*—Clay county (1 mine), 30,000; *Northeastern District*—Carter county (1 mine), 1,000.

The output by counties, in bushels, for the six months ending June 30, 1892, was as follows :

**OUTPUT BY COUNTIES.**

FOR SIX MONTHS ENDING JUNE 30, 1892.

COUNTY.	No. of Mines.	Lump.	Nut.	Slack and Pea.	Other Grades.	Total.
Butler . . .	1	134,507	45,460	23,302		203,269
Crittenden .	2	20,000	8,000		3,000	31,000
Christian . .	2	223,318	28,425	58,875	8,080	318,698
Daveiss . . .	10	83,422	9,165	16,356	164,280	273,223
Hendersson .	5	630,394	153,929	151,775	490,739	1,431,837
Hancock . . .	2				7,500	7,500
Hopkins . . .	11	2,838,439	1,034,052	475,785	4,490,292	8,838,568
McLean . . .	2	96,048	32,275	45,717	56,703	230,743
Muhlenberg .	8	1,374,194	257,360	411,109	1,111,221	3,153,884
Ohio . . . .	9	1,605,893	392,287	413,312	1,311,453	3,722,945
Union . . . .	8	522,784	179,830	109,496	282,823	1,094,933
Webster . . .	2	164,498	50,065	42,994	81,079	338,636
Totals . . .	62	7,693,497	2,195,848	1,748,721	8,007,170	19,645,236
Bell . . . .	2	12,793	1,625	10,582	233,736	258,736
Clay . . . .	1				30,000	30,000
Knox . . . .	1	330,637		254,588	418,226	1,003,451
Laurel . . .	17	958,119	339,081	58,880	1,271,191	2,627,271
Pulaski . . .	4	83,357	48,417	98,309	837,600	1,067,674
Rockcastle . .	1				137,358	137,358
Whitley . . .	8	1,417,838	567,800	322,537	1,269,932	3,578,107
Totals . . .	34	2,802,744	956,923	744,887	4,198,043	8,702,597
Boyd . . . .	2	1,290,398	215,032	215,032	374,313	2,094,775
Breathitt . .	1	27,385	675		103,493	131,553
Carter . . .	10	540,602	223,375	166,841	936,673	1,867,491
Lawrence . .	2	593,886	49,900	119,175	39,900	802,861
Menefee . . .	1				30,000	30,000
Totals . . .	16	2,452,271	488,982	501,048	1,484,379	4,926,680

The following table exhibits the output of shipping mines located on railroads for the first half of 1892 :

**BITUMINOUS MINES.**  
**OUTPUT OF SHIPPING MINES ON RAILROADS.**  
**[SIX MONTHS ENDING JUNE 30, 1892.]**

DISTRICT.	COUNTY.	Mines.	RAILROADS.	Total Bushels.	Bushels of Lump.
Western. . . .	Christian . . .	1	Henderson & Nashville Division L. & N. System . . . . .	316,698	228,318
	Daveiss . . .	1	Louisville, St. Louis & Texas . . . . .	52,125	38,875
	Henderson. . .	2	Louisville, St. Louis & Texas . . . . .	1,164,087	518,167
	Hopkins . . .	1	Providence Branch L. & N. System . . . . .	1,179,711	318,878
	"	2	Newport News & Mississippi Valley (C., O. & S. W.) . . . . .	2,171,163	918,898
	"	8	Henderson & Nashville Division L. & N. System . . . . .	5,487,704	1,605,667
	McLean. . . .	1	Owensboro & Nashville Division L. & N. System . . . . .	179,873	65,685
	Muhlenberg . .	4	Newport News & Mississippi Valley (C., O. & S. W.) . . . . .	1,589,068	822,809
	"	3	Owensboro & Nashville Division L. & N. System . . . . .	1,526,098	528,184
	Ohio . . . . .	2	Louisville, Hardinsburg & Western . . . . .	76,060	..
	"	2	Owensboro, Falls of Rough & Green River . . . . .	210,584	130,452
	"	5	Newport News & Mississippi Valley (C., O. & S. W.) . . . . .	3,436,301	1,475,441
	Union . . . . .	7	Ohio Valley . . . . .	1,088,454	472,400
	Webster. . . .	2	Providence Branch L. & N. System . . . . .	388,636	164,498
	.. . . .	..	.. . . .	..	..
	Totals . . . . .	41	.. . . .	18,746,097	7,272,767
Southeastern .	Bell . . . . .	2	Cumberland Valley Branch L. & N. System . . . . .	258,786	12,798
	Knox . . . . .	1	Cumberland Valley Branch L. & N. System . . . . .	1,008,451	380,687
	Laurel . . . .	17	Knoxville Branch L. & N. System . . . . .	2,627,271	958,119
	Pulaski . . . .	4	Cincinnati Southern . . . . .	1,067,674	88,857
	Rockcastle . . .	1	Knoxville Branch L. & N. System . . . . .	187,858	..
	Whitley . . . .	7	Knoxville Branch L. & N. System . . . . .	3,122,415	1,417,888
	"	1	Cincinnati Southern . . . . .	455,692	..
Totals . . . . .	.. . . .	88	.. . . .	8,672,597	2,802,744

Northeastern..	Boyd . . . . .	2	Newport News & Mississippi Valley (E. D.) . . . . .	2,094,775	1,290,898
	Breathitt . . . . .	1	Kentucky Union . . . . .	131,558	27,886
	Carter . . . . .	2	Eastern Kentucky . . . . .	243,246	50,603
	Lawrence . . . . .	7	Newport News & Mississippi Valley (E. D.) . . . . .	1,623,245	489,999
	Menefee . . . . .	2	Ohio & Big Sandy . . . . .	802,861	593,886
		1	Kentucky & South Atlantic . . . . .	30,000	
Totals . . . . .		15		4,925,680	2,462,271

## SUMMARY.

DISTRICT.	Mines.	Total Bushels.	Bushels of Lump.
Western . . . . .	41	18,746,097	7,272,767
Southeastern . . . . .	38	8,672,597	2,802,744
Northeastern . . . . .	15	4,925,680	2,452,271
Totals . . . . .	89	32,344,374	12,527,782

**OUTPUT FOR THE FISCAL YEAR 1892.**

The output of bituminous coal for the year ending June 30, 1892, 117 mines producing, amounted to 71,326,432 bushels (2,853,057 tons). This was an increase of 3,480,772 bushels over the returns for the year ending on the same date 1891.\* In the production of this coal 8,646 persons (maximum number) were employed, of whom 6,994 were engaged underground. The average number employed was 6,625, 5,406 being engaged underground.

Following is a summary of the returns :

**BITUMINOUS OUTPUT.**

[YEAR ENDING JUNE 30, 1892.]

DISTRICT.	Shipping Mines.		Non-shipping Mines		Totals.	
	No.	Product.	No.	Product.	No.	Product.
Western . . . . .	51	40,022,218	11	342,000	62	40,364,218
Southeastern . . . .	37	20,609,630	1	60,000	38	20,669,630
Northeastern . . . .	16	10,291,589	1	1,000	17	10,292,589
Totals . . . . .	104	70,923,432	13	403,000	117	71,326,432

\*Returns, amounting to 235,000 bushels, received from 12 of the smaller mines after my report for 1891 had gone to press, brought the output for that year up to 67,845,660 bushels, instead of 67,610,660, as given in the Report.

**EMPLOYES IN BITUMINOUS MINES.**

[YEAR ENDING JUNE 30, 1892.]

DISTRICT.	Maximum Number.			Average Number.		
	In.	Out.	Total	In.	Out.	Total.
Western . . . . .	3,510	939	4,449	2,801	733	3,534
Southeastern . . . . .	2,374	491	2,865	1,750	320	2,070
Northeastern . . . . .	1,110	222	1,332	855	100	1,021
Totals . . . . .	6,994	1,652	8,646	5,406	1,219	6,625

Included in the foregoing are 99 persons (maximum number) employed in the thirteen non-shipping mines.

The following table exhibits the bituminous output for the year ending June 30, 1892, in detail :

**BITUMINOUS MINES.**  
**OUTPUT OF SHIPPING AND NON-SHIPING MINES**  
**FOR YEAR ENDING JUNE 30, 1892.**

District.	Number of Mines	OUTPUT IN BUSHELS OF EIGHTY POUNDS.							
		Total all Grades	Lump.	Nut.	Run of Mines.	Slack.	Mixed Lump and Nut.	Pea.	Miscellane- ous.
Western . . . .	62	40,364,213	17,116,412	4,756,046	4,192,174	2,647,741	8,898,072	1,045,264	1,718,504
Southeastern . .	38	20,669,680	7,290,921	2,450,026	4,619,452	1,080,758	8,985,646	607,502	635,325
Northeastern . .	17	10,292,589	5,524,333	1,137,026	2,180,393	775,668	192,067	273,490	209,612
Totals . . . .	117	71,326,482	29,931,666	8,343,098	10,992,019	4,504,167	13,070,785	1,926,256	2,558,441
Equivalent tons . . . .		2,853,057 <sup>21</sup> / <sub>100</sub>	1,197,266 <sup>64</sup> / <sub>100</sub>	388,723 <sup>23</sup> / <sub>100</sub>	489,680 <sup>16</sup> / <sub>100</sub>	180,166 <sup>44</sup> / <sub>100</sub>	522,881 <sup>16</sup> / <sub>100</sub>	77,050 <sup>16</sup> / <sub>100</sub>	102,387 <sup>54</sup> / <sub>100</sub>

The following is a statement of the output of bituminous coal, by counties, for the years ending June 30, 1891 and 1892, arranged according to Districts, and with the gain or loss for each county stated. A detailed statement of the output of each county, for the year ending June 30, 1892, will be found in Part XII, "Special Notes on the Mines :"

## BITUMINOUS OUTPUT BY COUNTIES.

FISCAL YEARS 1891 AND 1892.

COUNTY.	1891.		1892.		Gain for 1892.	Loss for 1892.
	Mines.	Bushels.	Mines.	Bushels.		
Butler . . . . .	1	141,078	1	395,534	254,456	
Christian . . . . .	2	800,483	2	790,933		9,550
Crittenden . . . . .	1	47,700	2	78,090	30,300	
Daveiss . . . . .	7	323,213	10	537,273	214,060	
Hancock . . . . .	2	47,000	2	42,500		4,500
Henderson . . . . .	5	2,385,174	5	2,704,469	309,295	
Hopkins . . . . .	9	15,678,612	11	17,659,403	1,980,791	
McLean . . . . .	2	527,689	2	512,068		15,621
Munlenberg . . . . .	9	6,311,471	8	6,629,776	318,305	
Ohio . . . . .	7	7,835,111	9	8,144,097	308,986	
Union . . . . .	6	2,161,513	8	2,063,455		98,058
Webster . . . . .	2	818,412	2	806,705		11,707
Western District	59	37,087,456	62	40,364,213	3,416,193	139,436
Bell . . . . .	4	489,649	2	875,911	386,262	
Knox . . . . .	1	2,312,854	1	2,520,006	207,152	
Laurel . . . . .	14	6,855,901	19	6,636,784		219,117
Pulaski . . . . .	4	2,607,997	4	2,528,567		79,430
Rockcastle . . . . .	2	153,006	2	268,521	115,515	
Whitley . . . . .	4	6,494,074	8	7,779,841	1,285,767	
Clay . . . . .			1	60,000	60,000	
S. E. District . .	29	18,913,481	38	20,669,630	2,054,696	298,547
Boyd . . . . .	2	4,589,063	2	4,290,391		298,672
Breathitt . . . . .	1	150,891	1	263,977	113,086	
Carter . . . . .	9	4,738,669	10	3,881,859		856,810
Lawrence . . . . .	1	2,329,100	2	1,808,861		520,239
Powell . . . . .	1	2,000				2,000
Menefee . . . . .	2	35,000	2	47,500	12,500	
N. E. District . .	15	11,844,723	17	10,292,588	125,586	1,677,721

It will be observed in the foregoing that the increase of 3,480,771 bushels, for the year ending June 30, 1892, was alto-



gether due to gains in the Western and Southeastern Districts—chiefly in the former—those two Districts showing net gains of 3,276,757 and 1,756,149 bushels, respectively, or a total net gain of 5,032,906 ; while the Northeastern shows a net decrease of 1,552,135 bushels. It is worthy of note that not only does the Western District show the larger increase, but that the average proportion of the increment to the person employed underground was greater there than in the Southeastern District. The average proportion of the increment dug per man per day in the Western District was about 5.10 bushels ; in the Southeastern District it was 4.44 bushels.

The following table exhibits the number of employes, the days worked, the live stock, the number of strikes, the noteworthy accidents and the fatalities, reported by counties arranged in Districts, for the year ending June 30, 1892 :

# REPORT OF INSPECTOR OF MINES.

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## BITUMINOUS MINES. NUMBER OF EMPLOYEES, DAYS WORKED, STRIKES, LIVE STOCK AND FATALITIES. YEAR ENDING JUNE 30, 1892.

COUNTIES.	NUMBER OF EMPLOYEES.						Boys under 15 years	Days worked.	Number of strikes .	Number of Live Stock.			No. of noteworthy accidents . . . . .	Fatalities . . . . .
	Maximum.			Average.						In.	Out.	Total.		
	In.	Out.	Total.	In.	Out.	Total.								
Butler . . . . .	39	5	44	31	5	36	1	224	..	2	1	3	..	..
Christian . . . . .	139	37	176	109	15	124	2	144	..	7	3	10	..	..
Crittenden . . . . .	17	6	23	13	5	18	..	154	..	2	2	4	..	..
Daveiss . . . . .	73	21	94	48	13	61	..	1,556	..	4	3	7	1	..
Hancock . . . . .	18	6	24	6	4	10	..	180	1	..	..	..	..	..
Henderson . . . . .	282	73	355	155	34	189	15	1,016	1	23	17	40	..	..
Hopkins . . . . .	1,236	360	1,596	1,085	324	1,409	25	2,177	..	123	59	182	13	1
McLean . . . . .	71	10	81	37	7	44	..	509	..	5	3	8	1	..
Muhlenberg . . . . .	665	168	833	574	134	708	15	1,200	..	49	27	76	4	..
Ohio . . . . .	681	109	790	546	75	621	24	1,601	1	56	17	73	3	2
Union . . . . .	194	114	308	132	97	229	3	1,034	..	21	19	40	2	1
Webster . . . . .	95	30	125	65	20	85	5	186	1	8	2	10	..	..
West'n Dist. . . . .	3,510	939	4,449	2,801	733	3,534	90	9,981	4	300	153	453	24	4

## BITUMINOUS MINES—Number of Employees, Etc.—Continued.

COUNTIES.	NUMBER OF EMPLOYEES.						Boys under 15 years.	Days worked.	Number of strikes .	Number of Live Stock.			No. of noteworthy accidents . . . .	Fatalities . . . . .
	Maximum.			Average.						In.	Out.	Total.		
	In.	Out.	Total.	In.	Out.	Total.								
Number of Banks, or Mines . . . . .	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Number of Estab- lishments. . . . .	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Bell . . . . .	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Clay . . . . .	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Knox . . . . .	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Laurel . . . . .	11	19	11	19	11	19	11	19	11	19	11	19	11	19
Pulaski . . . . .	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Rockcastle . . . . .	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Whitley . . . . .	5	8	5	8	5	8	5	8	5	8	5	8	5	8
S. E. Dist.*	25	37	25	37	25	37	25	37	25	37	25	37	25	37
Boyd . . . . .	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Breathitt. . . . .	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Carter . . . . .	8	10	8	10	8	10	8	10	8	10	8	10	8	10
Lawrence . . . . .	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Menefee . . . . .	2	2	2	2	2	2	2	2	2	2	2	2	2	2
N. E. Dist..	13	17	13	17	13	17	13	17	13	17	13	17	13	17

\*It is not believed that the returns are complete for the number of boys employed in mines in this District, some operators deeming it unnecessary to report boys that are engaged in their Mines, but are employed by the miners (usually by the father) instead of by the company. This is especially true of Laurel county, where only three companies report boys, the total reported being only fourteen.

## SUMMARY FOR EMPLOYEES.

[BITUMINOUS MINES. YEAR ENDING JUNE 30, 1892.]

District.	No. of Estab- lishments.	No. of Banks.	Maximum.			Average.			Days.
			In.	Out.	Total.	In.	Out.	Total.	
Western . . . . .	55	62	3,510	989	4,449	2,801	788	3,584	9,981
Southeastern . . . . .	25	38	2,374	491	2,865	1,750	320	2,070	4,495
Northeastern . . . . .	18	17	1,110	222	1,382	855	166	1,021	2,549
Totals. . . . .	98	117	6,994	1,652	8,646	5,406	1,219	6,625	17,025

The average number of days worked at all establishments (117 mines) was 183.06 The average number worked in each District was as follows : Western, 181.47 ; Southeastern, 179.80 ; Northeastern, 196.11.

The average number of days worked at the shipping mines in each District was as follows : Western, 192.82 ; Southeastern, 175.83 ; Northeastern, 207.45.

**AVERAGE PRODUCT PER PERSON.**

The average yield of product per person employed underground, indicated by the foregoing returns for all mines, was as follows—the calculations being based on the average number of persons engaged underground :

*Western District.*—Average yield per person for whole number of days, 14,410.64 bushels. Average yield per person per day, 79.41 bushels.

*Southeastern District.*—Average yield per person for whole number of days, 11,811.21 bushels. Average yield per person per day, 65.72 bushels.

*Northeastern District.*—Average yield per person for whole number of days, 12,038.11 bushels. Average yield per person per day, 61.38 bushels.

Calling only that portion of the product profitable to the miner which consists of lump, run of mines, steam, mixed lump and nut (from all to 75 per cent. of this), and other "special" grades exclusive of nut, pea, slack and mixtures of them, the average yield of "profitable product" per person employed underground, indicated by the returns, was as follows :

*Western District.*—Average yield of profitable product per person for whole number of days, from 10,879.59 to 10,244.56 bushels. The first figures indicate the yield when the entire product of "mixed lump and nut" is regarded as profitable to the miner ; the second ones indicate the yield when the miner is given credit for 80 per cent. of that grade. Average yield per person per day, 59.95 to 56.45 bushels.

*Southeastern District.*—Average yield of profitable product per person for whole number of days, 9,139.26 to 8,683.76 bushels. Average yield per person per day, 50.83 to 48.29 bushels.

*Northeastern District.*—Average yield of profitable product per person for whole number of days, 9,236.01 to 9,191.08 bushels. Average yield per person per day, 47.09 to 46.86 bushels.

These results, as stated, are only indicative. They are not exact because the average is made for all persons engaged underground, whereas a certain (relatively small) proportion of the underground employes (such as drivers, track-layers, etc.) produce no coal, and the product per digger was, therefore, really

somewhat higher than the figures given show. Exact computations could not be made for the reason that, unfortunately, in the schedules returned by the operators the employes are not enumerated as to classes.\*

The larger return of product per person in the Western District may be attributed, probably, chiefly to the fact that the coals wrought there have a greater average thickness, respectively, than those worked in the Eastern Field, and that they are less "faulty." The fact that a large proportion of the output is produced by machines is also to be considered. It is to be regretted that the returns are not in such shape as render possible the institution of comparisons with reference exclusively to "pick coal." At no mine where machines are used was the output produced entirely by machine.

#### VALUE OF BITUMINOUS COAL PER TON.

The following table exhibits the selling value per ton, on board at the mines, of the total bituminous product reported to this Office, for the year ending June 30, 1892 :

##### FOR ALL MINES.

DISTRICT.	Mines.	Product in tons (2,000 lbs.)	Selling value at Mines.	Average value per ton.
Western . . . . .	62	1,614,568.52	\$1,365,590.808	\$0.8457
Southeastern . . . . .	38	826,785.20	870,101.247	1.0523
Northeastern . . . . .	17	411,703.56	366,228.714	0.8895
Totals . . . . .	117	2,853,057.28	\$2,601,920.76	\$0.9119

\*The Inspector admits that this is due to his own oversight.

The value of the product of the shipping mines was as follows:

**FOR SHIPPING MINES.**

DISTRICT.	Mines.	Product in tons (2,000 lbs.)	Selling value at Mines.	Average value per ton.
Western . . . . .	46	1,568,124.40	\$1,317,025.161	\$0.8398
Southeastern . . . . .	37	824,885.20	867,701.247	1.0525
Northeastern . . . . .	16	411,663.56	366,188.714	0.8895
Totals . . . . .	99	2,804,173.16	\$2,550,915.123	\$0.9096

**CANNEL MINES.**

The output of the Cannel Mines, in short tons, for the calendar year 1891, was as follows:

**YEAR 1891.**

COUNTY.	Number of Mines.	Product in Tons.
Carter . . . . .	1	5,178.85
Greenup . . . . .	(Group) 1	170.00
Hancock . . . . .	1	16,622.46
Johnson . . . . .	2	21,069.00
Totals . . . . .	5	43,040.31

As was anticipated, the output was less than that for 1890, the reduction amounting to 6,342.34 tons. The falling off occurred principally in Johnson county, the decrement there amounting to 7,736.25 tons. The output of Hancock shows an increase of 1,292.26 tons.

The output for the six months ending June 30, 1892, was as follows :

**FIRST HALF OF 1892.**

COUNTY.	Number of Mines.	Product in Tons.
Carter . . . . .	1	3,537.20
Greenup . . . . .	(Group) 1	535.00
Hancock . . . . .	1	6,145.00
Johnson . . . . .	2	13,347.84
Magoffin . . . . .	1	400.00
Totals . . . . .	6	23,965.04

This was an increase of 3,720.94 tons over the output for the same period in 1891.

The following table exhibits the output, number of employes, days worked, and number of live stock for the year ending June 30, 1892. The returns show an increase of production of 4,813 tons over the year ending on the same date 1891 :



## REPORT OF INSPECTOR OF MINES.

**CANNEL MINES.**  
**OUTPUT, EMPLOYES, ETC., OF COMMERCIAL MINES**  
**FOR YEAR ENDING JUNE 30, 1892.**

COUNTY.	Number of Mines . . . . .	Product in Tons . . . . .	EMPLOYEES.						Boys Under 15 Years . . .	Days Worked . . . . .	LIVE STOCK.			Kegs of Powder used . . . .
			Maximum.			Average.					Inside . . . . .	Outside . . . . .	Total . . . . .	
			Inside . .	Outside .	Total . .	Inside . .	Outside .	Total . .						
Carter . . . . .	1	6,003.95	65	37	102	87	26	63	2	2	4	276		
Greenup . . . . .	1	705.00	10	. .	10	10	. .	10	. .	. .	. .	150		
Hancock . . . . .	1	14,810.21	103	50	153	88	35	123	8	2	10	239		
Johnson . . . . .	2	24,842.09	125	30	155	125	26	151	4	1	5	410		
Magoffin . . . . .	1	400.00	6	. .	6	6	. .	3	. .	. .	. .	. .		
Totals . . . . .	6	46,761.25	309	117	426	266	87	353	14	5	19	* 790		

\* No reports were received as to the amount of powder used in Greenup and Magoffin counties. The total cost of 790 kegs reported was \$1,479. In the cannal mines the principal use for powder is in entry-driving; comparatively little is used for mining the coal.

**SUMMARY FOR BITUMINOUS AND CANNEL MINES.**

YEAR ENDING JUNE 30, 1892.

CHARACTER OF COAL.	Number of Mines	Product in Tons.	EMPLOYES.	
			Average.	Maximum.
Bituminous . . . . .	117	2,853,057.28	6,625	8,646
Cannel . . . . .	6	46,761.25	353	426
Totals. . . . .	123	2,899,818.53	6,978	9,072

Compared with the returns for the year ending on the same date 1891, this shows an increase of production amounting to 144,049 tons, an increase of 31 in the number of mines, and an increase of 1,469 in the maximum number of employees.

**POWDER CONSUMED.**

During the year ending June 30, 1892, 48,949 kegs of powder were used, 48,059 being used at the bituminous mines. The total cost (at the rate paid by the miner) was \$128,490.

At the 111 bituminous mines at which powder was used, 2,848,397 tons of coal were produced—an average of 59.27 tons per keg of powder consumed, the average cost of the latter being \$2.642.

The prices per keg ranged as follows: Western District, \$2, \$2.25, \$2.50, \$2.75 to \$3; prevailing price, \$3. Southeastern District, \$2, \$2.25, \$2.50 to \$3; prevailing price, \$2.50. Northeastern District, \$2, \$2.25, \$2.40 to \$2.75; prevailing price, \$2. It may be remarked that the lowest priced is not necessarily the "cheapest" powder; it may be less effective, and, therefore, necessitate the use of a larger quantity for a "shot," than the higher priced explosive. Moreover, a powder of the lower grade, which may serve well with one coal, may altogether fail with a harder, denser one. The prices here quoted are not, therefore, to be compared with each other with a view to ascertaining the relative "cheapness" of the explosive in the three Districts.

In the following table—showing the number of kegs used, the cost thereof and the tons of product per keg, according to Districts, for the year ending June 30, 1892—only those mines are included at which the coal is blasted:

## CONSUMPTION OF POWDER, ETC.

FOR THE YEAR ENDING JUNE 30, 1892.

District.	Number of Mines . .	Number of Kegs.	Total Cost.	Price per Keg.		Total Product in Tons.	Tons per Keg.	Product less Slack and Pea.	Tons per Keg.
				Average.	Prevailing.				
Western . . . . .	61	28,794	\$81,776.00	\$2.889	\$3.00	1,614,248.52	56.06	1,427,650.12	49.61
Southeastern . . . . .	36	13,177	31,977.50	2.426	2.50	824,385.20	62.56	726,854.80	55.16
Northeastern . . . . .	14	6,088	18,257.50	2.177	2.00	409,763.56	67.30	368,297.28	60.49
Total bituminous . . . . .	111	48,059	\$127,011.00	\$2.642	. . . . .	2,848,397.28	59.27	2,522,802.20	52.49
Cannel Mines . . . . .	6	890	1,479.00	1.661	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Totals . . . . .	117	48,949	\$128,490.00	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .

It is to be remarked that this table does not purport to show the number of tons of product that may be obtained per keg of explosive used only in *blasting the coal*, but simply the returns obtained per keg used for all purposes. A considerable percentage of the powder consumed was used in blasting top and bottom, in driving entries, etc.

## COAL CARRIED TO LOUISVILLE.

The tonnage of coal sent to Louisville from the Kentucky mines continues to increase, and there is also an increase of the proportion which the quantity consumed bears to the total fuel consumption of that city. Fuel for railway use is not included.

More coal was sent to this market from our mines during the *six months* ending June 30, 1892, than during any *fiscal year* prior to that of 1888. The western mines alone, during the six months indicated, sent more than was contributed by all Districts for the entire fiscal year of 1884, and within 73,782 tons of as much as was sent during the entire calendar year of 1886.

The percentage of Kentucky fuel used, referring to the total consumption of bituminous coal, has advanced from 23.18 in 1886 to 40.44 in 1891. The percentage of "Pittsburgh" used has fallen from 66.42 in 1886 to 48.49 in 1891.

The percentages which the several coals used at Louisville have borne to the total consumption during periods of three years each since 1885 are as follows :

	1886-'87-'88.	1889-'90-'91.	
Kentucky product. . . . .	24,658	30,578	Gain, 5,920
Pittsburgh . . . . .	66,626	59,185	Loss, 7,441
Kanawha, etc.. . . . .	8,714	10,235	Gain, 1,521
	100,000	100,000	

All coal received from Kentucky mines is brought by rail. The extent to which the Pennsylvania coal has been displaced, or, at least, its use limited by the Kentucky product within the eight recent years, under such circumstances, is significant. It is safe to assume that when cheaper transportation, by the improvement of our water-ways, especially the Kentucky river in its upper branches, shall have been secured to the regions of our better coals, this market, as well as others on the Ohio below it, will be principally supplied from our own fields.

Following is a statement, in tons, of the consumption of soft coal at Louisville for a series of calendar years.\*

\* Derived, in most part, from F. E. Saward's Annual, *The Coal Trade*, for 1892.

## BITUMINOUS COAL CONSUMED AT LOUISVILLE.

YEAR.	Kentucky Mines.		Pittsburgh.		Kanawha, Etc.		Total tons.
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.	
1886 . .	200,671	23.18	575,000	66.42	90,000	19.39	865,671
1887 . .	232,107	24.40	646,000	67.93	72,800	7.65	950,907
1888 . .	*296,694	25.98	750,000	65.69	95,000	8.32	1,141,694
1889 . .	*263,223	22.62	800,000	68.77	100,000	8.59	1,163,223
1890 . .	*313,863	29.21	640,000	59.59	120,000	11.18	1,073,863
1891 . .	*438,672	40.44	526,000	48.49	120,000	11.06	1,084,672
Totals . .	1,741,390	. . . .	3,937,000	. . . .	597,800	. . . .	6,276,190

\*These figures were furnished this office by the railroad companies. Fuel for railway use is excluded, but the figures include, of course, all other coal used in the city and its suburbs. The figures given in *The Coal Trade* are as follows: For 1888, 341,427 tons; for 1889, 298,118; for 1890, 304,399; for 1891, 393,105 tons.

*The Coal Trade* estimates the amount of coke used in 1891 at 50,000 tons. Of this only a very small proportion was supplied by Kentucky ovens.

## 1891.

Somewhat more than 15.3 per cent. of the total product of the shipping mines, for 1891, was sent to Louisville. This included a little more than 18 per cent. of the Western mines, and somewhat more than 17 per cent. of the Southeastern ones. Of the product known as "Jellico" coal, Louisville received 1,380,725 bushels, or about 19 per cent. of the total output of the Whitley county mines.

For the *Six months ending December 31, 1891*, the shipments from both coal-fields to this market amounted to 5,602,925 bushels (224,117 tons), as follows :

## SIX MONTHS ENDING DECEMBER 31, 1891.

DISTRICT.	By Lou So.	By L. & N.	By C., O. & S. W.	By L., St. L. & T.	Total Bushels.	Equivalent Tons.
Western . . .	. . . .	10,925	3,128,125	557,400	3,696,450	147,858
Southeastern .	96,000	1,810,475	. . . . .	. . . . .	1,906,475	76,259
Totals . . .	96,000	1,821,400	3,128,125	557,400	5,602,925	224,117

This was an increase of 1,815,850 bushels over the amount received during the same period in 1890. It will be observed that the Louisville Southern entered the list of roads supplying this market.

For the *calendar year 1891* the receipts amounted to 10,966,800 bushels (438,672 tons), and were contributed by the several railroads in the following proportions :

**CALENDAR YEAR 1891.**

DISTRICT.	By Lou. So.	By L. & N.	By C., O. & S. W.	By L., St. L. & T.	Total Bushels.	Equiv- alent Tons.
Western . . .		17,375	6,096,950	1,067,125	7,181,450	287,258
Southeastern .	96,000	3,689,350			3,785,350	151,414
Totals . . .	96,000	3,706,725	6,096,950	1,067,125	10,966,800	438,672

This was an increase of 3,120,225 bushels (124,809 tons) over 1890.

**1892.**

For the six months ending June 30, 1892, the shipments from the Kentucky mines to this market amounted to 4,708,150 bushels (188,326 tons). This is a falling off, compared with the figures for the same period in 1891, of 655,725 bushels, the shipments from the Western mines having fallen off 312,775 bushels, and those from the Southeastern 342,950. The latter reduction was chiefly in the shipments from the "Laurel" and "Cumberland Valley"\* regions, the mines there (with one exception) having been idle, on account of a strike or lockout, during May and June. The decrement of the shipments from those regions amounted to 332,600 bushels, while the receipts of "Jellico" coal fell off only 54,350 bushels.

The following figures were kindly furnished by S. R. Knott, Esq., First Vice-President Louisville & Nashville Railroad; C. F. Krebs, Esq., Auditor Newport News & Mississippi Valley Company (Western Division); J. K. McCracken, Esq., Auditor Louisville, St. Louis & Texas Railway, and Charles H. Davis, Esq., Comptroller East Tennessee, Virginia & Georgia Company, Lessee of the Louisville Southern :

\*The "Cumberland Valley" region includes Knox and Bell counties.

## SIX MONTHS ENDING JUNE 30, 1892.

DISTRICT.	By Lou. South.	By L. & N.	By C., O. & S. W.*	By L., St. L. & T.	Total Bushels.	Equiva- lent tons.
Western . . .	.....	.....	2,750 600	421,625	3,172,225	126,889
Southeastern .	44,000	1,491,925	.....	.....	1,535,925	61,437
Totals . . .	44,000	1,491,925	2,750,600	421,625	4,708,150	188,326

The shipments over the Louisville & Nashville road were made up of 670,650 bushels of "Jellico" coal; 373,900 bushels from mines on the Cumberland Valley Branch—principally from Knox county; and 447,375 bushels from other Southeastern Mines—chiefly from Laurel county.

The receipts by the Louisville Southern came, probably, from Pulaski county.

The receipts by the Louisville, St. Louis & Texas came principally from Henderson county; a small amount from mines about Fordsville, in Ohio county.

Shipments over the Chesapeake, Ohio and Southwestern came, nearly all, from mines in Muhlenberg, Ohio and Hopkins counties.

Following is the record, in bushels, of shipments to Louisville for a series of fiscal years, ending June 30:

## SHIPMENTS TO LOUISVILLE BY FISCAL YEARS.

YEAR ENDING JUNE 30.	By L. & N.	By C., O. & S. W.	By L., St. L. & T.	By Lou. So.	Total Bushels.	Equiva- lent Tons.
1884 . . .	460,900	2,643,075	.....	.....	3,103,975	124,159
1885 . . .	1,329,650	2,685,575	.....	.....	4,015,225	160,609
1886 . . .	2,275,325	1,690,950	.....	.....	3,966,275	158,651
1887 . . .	1,611,950	2,171,275	.....	.....	3,783,225	151,329
1888 . . .	2,909,975	4,145,300	.....	.....	7,055,275	282,211
1889 . . .	2,080,325	4,153,500	.....	.....	6,233,825	249,853
1890 . . .	3,183,050	4,641,425	500	.....	7,824,975	312,999
1891 . . .	3,033,525	5,339,600	777,825	.....	9,150,950	366,038
1892 . . .	3,313,325	5,878,725	979,025	140,000	10,311,075	412,443
Totals .	20,198,025	33,349,425	1,757,350	140,000	55,444,806	2,217,792

The shipments, it will be noted, have increased more than 232 per cent. within the eight fiscal years succeeding 1884.

\*The popular name, "Chesapeake, Ohio & Southwestern," is used for that portion of the Newport News & Mississippi Valley (W. D.) road over which the coal was carried.

**SHIPMENTS TO OTHER STATES.**

The shipment of bituminous coal\* to other States for the year ending June 30, 1892, amounted to 22,452,787 bushels, an increase of 367,099 bushels over the preceding year. The increase is to be altogether attributed to the Southeastern mines, they having increased their outward shipments by 568,349 bushels, while the Western mines fell 200,500 below their figures for last year. The shipments from the Southeastern District were principally from the "Jellico" mines.

Following is a summary of the outward shipments by Districts :

DISTRICT.	Mines Shipping.	Total Bushels	Equivalent Tons.
Western . . . . .	34	16,182,639	647,305.56
Southeastern . . . . .	14	4,700,648	188,025.92
Northeastern . . . . .	4	1,569,500	62,780.00
Totals . . . . .	52	22,452,787	898,111.48

The shipments to other States lacked but 397,213 bushels of equaling the entire commercial product for 1880.

\* In the Reports of this Office canal is always treated as a distinct item in the statistics.



Following is a statement of the outward shipments by counties :

### OUTWARD SHIPMENTS BY COUNTIES.

[YEAR ENDING JUNE 30, 1892.]

COUNTY.	Com- panies shipping	Mines.	Total product of mines shipping, in tons.	Tons shipped out.
Butler . . . . .	1	1	15,821.36	1,207.00
Christian . . . . .	1	1	31,317.32	28,800.00
Henderson . . . . .	1	1	51,006.20	20,000.00
Hopkins . . . . .	8	11	706,376.12	371,829.48
McLean . . . . .	1	2	20,482.72	9,600.00
Muhlenberg . . . . .	8	8	265,191.04	92,100.44
Ohio . . . . .	3	4	299,651.76	87,611.32
Union . . . . .	3	6	74,743.60	11,924.32
Webster . . . . .	1	2	32,268.20	24,240.00
Western District . . . .	27	36	1,496,858.32	647,305.56
Bell . . . . .	1	1	26,828.44	157.00
Knox . . . . .	1	1	100,800.24	200.00
Laurel . . . . .	11	19	265,471.36	2,084.92
Pulaski . . . . .	1	2	26,395.96	4,770.00
Whitley . . . . .	5	8	311,193.64	180,864.00
Southeastern District . . .	19	31	730,689.64	188,025.92
Boyd . . . . .	1	2	171,615.64	12,780.00
Lawrence . . . . .	1	2	72,354.44	50,000.00
	2	4	243,970.08	62,780.00

### SUMMARY OF PRODUCTION BY YEARS.

The following table exhibits the output of the bituminous collieries (commercial coal) for a period of years. It is the most complete statement that has yet been published, and is believed to be as accurate as can now be compiled.

It may be noted that within the twenty-one years since coal mining was established as a notable industry in the State (in 1870) the output has increased more than seventeen-fold, and that the growth has been especially rapid within the last eight years. The output of commercial coal alone for 1891 shows an increase of more than 1,619 per cent. over the amount reported for the entire State in 1870, and of more than 229 per cent. over

the commercial production for 1880. In 1891 two shipping mines alone, in Hopkins county, produced within 1,130 tons of as much coal as was reported for all classes of mines for the entire State in 1870; and the commercial mines of Hopkins county alone produced within 282,702 of as many tons as were reported for all mines for the entire State in 1880.

### PRODUCTION OF COMMERCIAL BITUMINOUS COAL.

[IN TONS OF 2,000 POUNDS.]

YEAR.	N. E. District.	S. E. District.	Western Field.	Total Tons.
1881 . . . . .	?	?	804,281	?
1882 . . . . .	539,700		760,300	1,300,000
1883 . . . . .	267,257	360,000	945,412	1,572,669
1884 . . . . .	278,630	395,770	875,600	1,550,000
1885 . . . . .	280,595	456,000	863,405	1,600,000
1886 . . . . .	706,757		943,243	1,650,000
1887 . . . . .	350,564	600,339	982,282	1,933,185
1888 . . . . .	376,425	729,447	1,236,186	2,342,058
1889 . . . . .	405,361½	630,496½	1,169,576	2,205,434
1890 . . . . .	457,480	725,917	1,299,797	2,483,144
1891 . . . . .	444,378	871,268	1,591,450	2,907,096

The commercial cannel product is not included in the above.

In the above statement the figures are largely estimative down to the year 1888. Prior to that year no special statistics relating to production of coal were collected by the State. I am indebted to Mr. F. E. Saward's excellent Annual, *The Coal Trade*, for the figures relating to the Western District for the years 1881-'2-'3-'5-'6. For the years succeeding 1887 the figures represent the tabulations of actual returns from all the commercial bituminous mines, received by this Office.

### SUMMARY OF TOTAL PRODUCTION BY YEARS.

According to the U. S. Census returns, the output for the entire State in 1840 amounted to 25,906 short tons; in 1860 it amounted to 269,280 short tons; in 1870 to only 169,120; in 1880 to 946,288, and in 1890 \* to 2,701,496 short tons. This included all classes of bituminous coal—both "ordinary bituminous" and cannel.

\* "Mineral Resources," issued by U. S. Geological Survey, for 1889-'90.

It is interesting to note that the counties reported in the Census of 1840 as producers of coal were the following: Butler, Christian, Hancock, Livingston and Muhlenberg, in the Western Field; and Breathitt, Clay, Estill, Floyd, Pulaski, Wayne and Whitley, in the Eastern one. The remarkable statement is made in the report that 2,380 short tons of anthracite were produced—140 in Butler and 2,240 in Livingston. The error was, of course, due to the misclassification of the coal by the local agent reporting it. The number of employes at mines reported for 1840 was 240, and the capital invested was placed at \$90,777.

The figures given for the production of this State in the various Census Reports are, especially in the earlier reports, largely estimative. Even the returns presented by the last Census (1890)—which are undoubtedly fuller and more trustworthy than those of any preceding one—are affected by the element of guess.

For several years the United States Geological Survey, in a publication entitled "Mineral Resources," has presented annual statements of the output of the State. It is evident to one well acquainted with our coal-fields that the element of guess has likewise played a conspicuous part in the returns given by the Survey, and it is difficult to determine just what value is to be placed upon them.

It may be accepted, however, that the returns given by the Census Bureau and in "Mineral Resources" are, so far as regards the *total product of the entire State*, the best estimates now obtainable, and they are, therefore, presented below:

**TOTAL OUTPUT FOR ENTIRE STATE.**

YEAR.	Short Tons.	YEAR.	Short Tons.
1840 * . . . . .	25,906	1880 * . . . . .	946,288
1860 * . . . . .	269,280	1881 † . . . . .	1,232,000
1870 * . . . . .	169,120	1882 † . . . . .	1,456,000
1871 . . . . .		1883 † . . . . .	1,848,000
1872 . . . . .	?	1884 † . . . . .	1,736,000
1873 † . . . . .	336,000	1885 . . . . .	
1874 † . . . . .	408,200	1886 . . . . .	
1875 † . . . . .	420,000	1887 . . . . .	
1876 † . . . . .	728,000	1888 . . . . .	
1877 † . . . . .	952,000	1889 . . . . .	
1878 † . . . . .	1,008,000	1890 † . . . . .	2,701,496
1879 † . . . . .	1,120,000		

\* Reported in U. S. Census Reports.

† Reported in Mineral Resources.

‡ Reported by Mr. R. P. Rothwell, editor of *Engineering and Mining Journal*.

**BULLETIN FOR 1890.**

The following statement, issued by the Statistical Department of the U. S. Geological Survey, is included in this Report in order that it may be accessible in the printed records of this Office :

## OUTPUT FOR 1890 AS REPORTED IN "MINERAL RESOURCES OF THE U. S."

COUNTIES.	Loaded at mines for shipment.		Sold to local trade and used by em- ployes.		Used at mines for steam and heat.		Made into coke.		Total amount		Total value.	Number of active days . . . . .	Average number employed . . . .
	Short tons.		Short tons.		Short tons.		Short tons.		Short tons.				
Butler, Christain, Crittenden and Daveiss	42,363		900		1,668				44,931		\$41,652	164	152
Boyd and Pulaski	188,027		3,473		100				191,600		163,176	275	312
Carter	175,670		960		2,749				179,379		197,027	287	459
Hancock, Henderson and McLean.	122,400		3,040		1,200				126,640		126,650	224	206
Hopkins	557,937		13,532		10,565		22,273		604,307		461,177	231	1,104
Johnson	20,822		400						21,222		45,234	267	110
Knox	89,200		800						90,000		69,600	240	200
Laurel	234,490		55,480		1,258				291,178		276,718	225	680
Muhlenberg	218,835		14,460		7,688				240,983		193,380	213	495
Ohio	262,720		3,700		1,316				267,736		208,072	236	520
Union	56,587		11,176						67,763		72,999	189	181
Webster and Lawrence	129,723		2,069		1,424				133,216		149,860	264	265
Whitley	259,215		1,726		1,600				262,541		286,724	204	625
Small mines			180,000						180,000		180,000		
Total	2,357,989		291,666		29,568		22,273		2,701,496			(a) 219	5,259

(a) Average for the State.

[It should be stated that there is no report for Bell county in the above; also, that the output of canal alone for Johnson county exceeded the total given in this table. According to figures furnished this office, Johnson county produced 28,806½ tons of canal in 1890. See my Report for 1891.—C. J. N.]

## IV.

## THE COKE INDUSTRY.

During the past fiscal year (ending June 30th) comparatively little general progress was made towards advancing the development of the coke industry.

In the Western District the St. Bernard Coal Company increased its plant of ovens, at Earlington, from 58 to 84—it now has 104—increased its output by 10,310.65 tons, and made certain improvements in the direction of perfecting its already excellent coal-washing plant. On October 1st it had six Campbell washers in operation. (See notes by Mr. J. B. Atkinson, on a succeeding page, on the comparative effectiveness of this machine.) The Ohio Valley Coal and Mining Company has made a start with ten ovens, and expects to put up a washing plant (without which it is useless to attempt to coke the coal mined there) at an early date. The Sturgis Coal and Coke Company had proposed the erection of ovens, but has postponed the matter.

## THE ST. BERNARD COAL CO.

The St. Bernard Company is the only one that has made continuous progress. Statistics of its production are as follows :

## CALENDAR YEARS.

	No. of Ovens.	Tons of Product..
Calendar year 1891 . . . . .	84	22,166 80
Calendar year 1890 . . . . .	58	11,136.00
Increase . . . . .	26	11,030.80

## FISCAL YEARS.

	No. of Ovens.	Tons of Product.
Year ending June 30, 1892 . . . . .	84	27,200.45
Year ending June 30, 1891 . . . . .	58	16,889.70
Increase . . . . .	26	10,310.75

**SOUTHERN LAND IMPROVEMENT COMPANY.**

In the Southeastern District the East Kentucky Coal and Iron Company and its successor, the Southern Land Improvement Company (present owner), completed the plant of 100 ovens on Straight creek, above Pineville, originally begun by the Pine Mountain Iron and Coal Company in the latter part of 1890. The first coke was turned out in July, 1891, and the production for that year (six months) amounted to 7,404 tons. Statistics of the Southern Land Improvement Company's production for the fiscal year are as follows :

	<i>Tons.</i>
Six months ending December 31, 1891 . . . . .	7,404
Six months ending June 30, 1892 . . . . .	4,156.25
Year ending June 30, 1892. . . . .	<u>11,560.25</u>

It may be noted that the last half of the fiscal year shows a reduction of 3,247.75 tons. This was due to temporary suspensions of work attributable to strikes and various business exigencies.\*

**THE BRECKENRIDGE AND PINEVILLE SYNDICATE.**

The plants of the Cumberland Valley Colliery Company, in the region of Pineville, (recently acquired by the Breckenridge-Pineville Syndicate, Limited), have been idle, or with but few of the ovens burning, during the entire fiscal year. Operations at Colliery No. 2, with its block of 50 ovens, were entirely suspended, and at Colliery No. 1 (25 ovens) little work was done.

\* The Central Appalachian Company, Limited, has recently secured control, by lease, of the Southern Land Improvement Company's plant, and proposes to operate it at its full capacity.—Nov. 10, 1892.

No coke has been made at either plant since June 30, 1892. Statistics of the production of the Cumberland Valley Colliery Company, and of its late lessees, A. G. White & Co., are as follows :

**CALENDAR YEARS.**

YEAR.	TONS OF PRODUCT.
Calendar year 1880 . . . . .	9,574
Calendar year 1891 . . . . .	3,123
Decrease for 1891 . . . . .	6,451

**FISCAL YEARS.**

YEAR.	TONS OF PRODUCT.
Year ending June 30, 1891 . . . . .	6,068
Year ending June 30, 1892 . . . . .	2,767
Decrease for year ending June 30, 1892 . . . . .	3,291

**NUMBER OF AVAILABLE OVENS.**

The number of available ovens in the State on October 1st was 279, distributed as follows :

St. Bernard Coal Co.'s, Hopkins county . . . . .	104
Southern Land Improvement Co.'s, Bell county . . . . .	100
Breck-Pineville Syndicate, C. V. Coll'y, No. 1, Bell county . . . . .	25
Breck-Pineville Syndicate, C. V. Coll'y, No. 2, Bell county . . . . .	50
	<u>279</u>

The average number of ovens burning during the six months ending June 30, 1892, at the respective establishments, was as follows : Cumberland Valley Colliery, No. 1 (now controlled by the Breckenridge-Pineville Syndicate, Limited), 5 ; Southern Land Improvement Company's, 40 ; St. Bernard Coal Company's, 78. Total, 123.



**TOTAL PRODUCTION OF COKE.**

Following are consolidated statements of the production of coke :

CALENDAR YEAR 1891.

COMPANY.	Six Months to June 30, '91.	Six Months to Dec. 31, '91.	For Year.
St. Bernard Coal Co. . . . .	8 988.70	13,178.10	22,166.80
Cumberland Valley Colliery Co.* . .	778.00	2,345.00	3,123.00
E. Ky. Coal & Iron Co.† . . . . .		7,404.00	7,404.00
Totals . . . . .	9,766.70	22,927.10	32,693.80

*a* Now Breckenridge and Pineville Syndicate, Limited.

† Now Southern Land Improvement Company.

The figures show an increase of 11,983.80 tons over the product for 1890.

SIX MONTHS ENDING JUNE 30, 1892.

COMPANY.	Average Ovens Burning.	Tons of Product.
St. Bernard Coal Co. . . . .	78	14,022.35
Cumberland Valley Colliery Co. <i>a</i> . . . . .	5	422.00
East Kentucky Coal and Iron Co. <i>b</i> . . . . .	40	4,156.25
Totals . . . . .	123	18,600.60

\* Now Breckenridge-Pineville Syndicate, Limited.

*b* Now Southern Land Improvement Company.

The figures show an increase of 8,833.90 tons over the production for the same period in 1891.

**FISCAL YEAR ENDING JUNE 30, 1892.**

COMPANY.	TONS OF PRODUCT.
St. Bernard Coal Company . . . . .	27,200.45
Cumberland Valley Colliery Company <i>a</i> . . . . .	2,767.00
East Kentucky Coal and Iron Company <i>b</i> . . . . .	11,560.25
Totals . . . . .	41,527.70

*a* Now Breckenridge-Pineville Syndicate, Limited.

*b* Now Southern Land Improvement Company.

The following statement shows the production of coke from the date of the establishment of the industry :

**COKE PRODUCTION BY YEARS.**

YEAR.	Western Field.	Eastern Field.	Total.
1887 <i>a</i> . . . . .	4,000.00	. . . . .	4,000.00
1888 <i>b</i> . . . . .	9,054.50	. . . . .	9,054.50
1889 <i>c</i> . . . . .	7,447.81	1,892.25	9,340.06
1890 . . . . .	11,136.00	9,574.00	20,710.00
1891 . . . . .	22,166.80	10,527.00	32,693.80
1892 (first half) . . . . .	14,022.35	4,578.25	18,600.60
Totals . . . . .	67,827.46	26,571.50	94,398.96

**NOTES ON THE CAMPBELL COAL-WASHER.**

The following note from Mr. J. B. Atkinson, Vice-President and Treasurer of the St. Bernard Coal Company, upon the merits of the Campbell Coal-washer, which has been developed at the Earlington mines of his company, and which was described at length in the Report of this Office for 1891, will be of interest to all concerned with the coke industry :

*"C. J. Norwood, Esq., Inspector of Mines :*

*"DEAR SIR: In answer to your request for my experience with the Campbell Coal-washer the past year, and how results compare with those of other washers, especially the Lührig, I will give you the facts as I have them :*

*"Many washers give fair results in cleaning the coal from impurities, but at the expense of great waste in coal. Most of the washing machines lose from 5 per cent. to 9 per cent. of coal. My best result with combined jig with sluice shows 4.4 per cent. loss, while the average loss has been much greater.*

*a* The entire product for this year was made at the Clifton ovens, in Hopkins county.

*b* The Clifton ovens produced 2,500 tons; the remainder was made at the St. Bernard ovens.

*c* The Clifton ovens were not producing. From and including this year all the Western coke was made at the St. Bernard ovens.

"The Lührig washer, which is the best and most complete jig coal-washing machine that I have seen, made a run on our Kentucky No. 9 and No. 11 crushed run-of-mines, at Birmingham, Alabama. Samples of the washed coal showed 2.03 per cent. of removable dirt remaining, while the fixed dirt showed a loss of 2.43 per cent. of coal.

"Only slack coal is being used on the Campbell machines at Earlington. This slack contains from 10 per cent. to 20 per cent. of removable dirt, as it comes from the different mines, and is dumped indifferently into the receiving hopper ; no effort being made to mix the various grades. All fine coal that passes a screen with  $\frac{3}{4}$  inch by  $\frac{3}{4}$ -inch meshes is taken by the machines without further sizing, with the following results, most careful examinations being made :

June 27.	Unwashed slack contained. . . . .	18.90 per cent. removable dirt.
	Washed slack contained. . . . .	0.94 per cent. removable dirt.
June 28.	Washed slack contained. . . . .	1.02 per cent. removable dirt.
	Final dirt contained. . . . .	0.95 per cent. coal.
July 9.	Final dirt contained. . . . .	1.10 per cent. coal.
July 13.	Washed slack contained. . . . .	1.56 per cent. removable dirt.
	Washed slack (second sample) contained . . . . .	1.45 per cent. removable dirt.
July 14.	Washed slack contained. . . . .	1.61 per cent. removable dirt.
	Final dirt contained. . . . .	1.22 per cent. coal.
July 22.	Washed slack contained. . . . .	1.03 per cent. removable dirt.
	Washed slack (second sample) contained . . . . .	1.79 per cent. removable dirt.
July 23.	Washed slack contained. . . . .	2.50 per cent. removable dirt.
	Final dirt contained . . . . .	1.14 per cent. coal.
Aug. 2.	Final dirt contained . . . . .	1.06 per cent. coal.
	Washed slack contained. . . . .	2.67 per cent. removable dirt.
Aug. 3.	Washed slack contained. . . . .	1.33 per cent. removable dirt.
	Final dirt contained . . . . .	0.43 per cent. coal.
Aug. 4.	Washed coal contained . . . . .	1.33 per cent. removable dirt.

#### SUMMARY.

"Twelve examinations of the washed slack gave an average of 1.56 per cent. removable dirt left in the coal.

"Six examinations of final dirt gave an average of 0.99 per cent. coal lost.

"The removable dirt of our coals, when burned, gives 44 per cent. to 52 per cent. ash ; hence, in coking, the average increase of ash in the coke of the twelve examinations would be about 1.56 per cent. greater than if the coals were perfectly clean—containing only fixed ash. Very truly,

"JNO. B. ATKINSON, *Vice-President.*"

## ACCIDENTS.

During the calendar year 1891, forty-three noteworthy accidents—mere bruises and trivial injuries not being included—occurred at the mines, thirty-nine of them occurring underground. Sixteen were fatal, causing ten widows and twenty orphans (minors).

The following table exhibits the number arranged according to causes :

[CALENDAR YEAR 1891.]

CAUSES.	Fatal.		Serious.		Not Serious.		Totals.	
	Inside.	Outside.	Inside.	Outside.	Inside.	Outside.	Inside.	Outside.
Falls of Top . . . . .	10	0	9	0	3	0	22	0
Falls of Coal . . . . .	1	0	1	0	0	0	2	0
Mine Cars . . . . .	2	0	4	0	5	0	11	0
Missed Shots . . . . .	0	0	3	0	0	0	3	0
On Gravity Plane. . . .	0	1	0	0	0	0	0	1
Miscellaneous. . . . .	0	2	1	1	0	0	1	3
Totals . . . . .	13	3	18	1	8	0	39	4

Accidents due to falls of top occurred, with reference to Districts, as follows: In the Western, 4; 1 fatal and 2 serious. In the Southeastern, 9; 3 fatal and 5 serious. In the Northeastern, 9; 6 fatal and 2 serious. Most of the accidents due to

mine cars occurred in the Western District, where there were nine, 2 of them fatal and 2 serious.

For the year ending June 30, 1892, forty-four noteworthy accidents have been reported, forty of which occurred within the mines. The fatalities were eleven in number, eight of them occurring underground, causing five widows and five orphans (minors). Six of the deaths were caused by falls of slate—one in the Southeastern and five in the Northeastern District; and three were due to mine cars, one occurring outside. One was due to an accident on a gravity plane, and one was the result of (presumably) an attack of vertigo, the person seized being caught by a descending cage.

The following table exhibits the number of accidents arranged according to causes and with reference to Districts, for the year ending June 30, 1892:

**ACCIDENTS.**  
FOR YEAR ENDING JUNE 30, 1892.

DISTRICT.	Falls of Slate. . .	Falls of Coal . . .	Missed Shot . . .	MINE CARS.			MISCELLANEOUS.			SERIOUS.			NOT SERIOUS.			TOTAL.		
				Inside . . .	Outside . .	Total	Inside . . .	Outside . .	Total . . .	Inside . . .	Outside . .	Total . . .	Inside . . .	Outside . .	Total . . .	Inside . . .	Outside . .	Total . . .
Western . . . . .	2	3	2	12 <sup>c</sup>	1 <sup>d</sup>	13	2	2 <sup>e</sup>	4	10	1	11	9	..	9	21	3	24
Southeastern . . .	7 <sup>a</sup>	2	1	1	..	1	1	1 <sup>f</sup>	2	7	..	7	4	..	4	12	1	13
Northeastern . . .	5 <sup>b</sup>	..	..	1	..	1	1	..	1	2	..	2	..	..	..	7	..	7
Totals . . . . .	14	5	3	14	1	15	4	3	7	19	1	20	13	..	13	40	4	44

<sup>a</sup> 1 fatal; <sup>b</sup> 5 fatal; <sup>c</sup> 2 fatal; <sup>d</sup> fatal; <sup>e</sup> 1 fatal; <sup>f</sup> fatal.

In the following descriptive lists, the quoted remarks are statements made by the Company reporting.

#### BOYD COUNTY.

Total noteworthy accidents reported . . . . . 2  
Fatalities . . . . . 2

*No. 6 Rush Mine*, of the Ashland Coal & Iron R'y Co.—Samuel Lusk, a miner; an adult. November 14, 1891. Killed by a fall of slate.

2.—Whit Lusk, a miner; an adult. November 14, 1891. Killed by a fall of slate. Left a widow and three children.

“The above men (brothers) were drawing entry stumps, and were working on the night shift. When found in the morning, they were found lying side by side in entry, about three or four feet from face of right-hand stump, where they were working, covered by about a half to a ton of slate. The place was heavily working—creeping and crushing and bottom heaving, when they were found.”

#### CARTER COUNTY.

Total noteworthy accidents reported . . . . . 4  
Serious. . . . . 2  
Fatal . . . . . 2

*Star Furnace Mine*, of the Norton Iron Works.—William Duncan, a driver; an adult. December 12, 1891. Fell ahead of his trip. Car ran over and mashed one of his fingers so badly as to necessitate amputation.

2.—Richard Hampton, a miner; an adult. December 28, 1891. Killed by a fall of slate while drilling for a shot. “He neglected to post his place.”

*Mt. Savage Mine*, of the Lexington and Carter County Mining Co.—Edward Cartwright, a miner; an adult. April 12, 1892. Powder fired while he was loading a hole. Fingers broken, faced burned. Not yet known (June 30) whether eyesight is destroyed.

*Music Mine*, of the Lexington and Carter County Mining Co.—December 15, 1891. John Deerfield, a miner; an adult. Fatally injured by fall of slate. Back and hips crushed. Left widow and one child.

## DAVEISS COUNTY.

Total noteworthy accidents reported . . . . . 1

*C. L. Nall's Mine*, Wilson Ford, a miner; an adult. Was learning to mine. December 16, 1891. Returned upon a blast, thinking that the shot had failed, and was injured internally by the explosion, and badly burned and bruised. Went home January 2, 1892, and the final result of the accident is unknown at the mine.

## HOPKINS COUNTY.

Total noteworthy accidents reported . . . . . 13

Serious . . . . . 6

Fatal . . . . . 1

*St. Bernard Coal Company's No. 9 Mine*.—Louis Miller, colored; a laborer. December 31, 1891. Was forking coke at the ovens. Tried to couple railroad cars on switch. Hand mashed between draw-heads; two fingers broken.

2. James Offett, colored; a miner. April 14, 1892. Was standing in mouth of his room while driver was coming down entry with empty car. Car took wrong track, caught his leg and broke it.

(Slight accidents, of trivial nature, are reported with reference to L. D. Caldwell, Hardin Bone and Thos. Longstaff.)

*St. Bernard Coal Company's No. 11 Mine*.—Tol Sisk, a loader. December 22, 1891. Head cut and back bruised by fall of slate. "Not serious."

*St. Bernard Coal Company's Diamond Mine*.—Dick Morton, colored; a miner. February 15, 1891. Leg broken while taking down a standing shot.

2. Louis Dickson, a miner. August 7, 1891. Was driving an entry to meet a room, for air. Room miner fired a blast without giving warning. Blew coal against Dickson. Finger broken, face bruised. Lost three weeks.

(James Dickson, son of former, was slightly hurt at the same time.)

*St. Bernard Coal Company's St. Charles Mine*.—L. V. Todd, a driver. October 22, 1891. Hand mashed between car and rib. Off work till December 15, 1891.



2. Jno. Price, a driver. January 18, 1892. Was hauling a two-car trip—standing on bumpers between the cars. Mules ran into a cross-cut, pulled front car off track and Price's foot was mashed.

*Co-operative Mine.*—G. Ivy, a trapper; a boy. December 9, 1891. Arm crushed by car leaving track, necessitating amputation. Amputation performed December 13, and he died December 19.

2. Jno. Kerup, a miner; an adult. January 23, 1892. Foot mashed by fall of coal. Lost ten days.

3. G. Fort, colored, a driver; an adult. December 1, 1891. Arm caught between car and rib. Lost one month.

4. Lee Gamblin, a driver; an adult. June 17, 1892. Fingers mashed by being caught between car and rib. Lost seventeen days.

(Slight accidents to W. T. Green and James Rodgers are reported.)

*Hecla Mine.*—Jess Vinson, a boy. Date not given, presumably in 1891. Fell from a car, was run over and leg broken. Operator says "accident was due to his own carelessness."

*Crabtree Mine.*—Wess Bourland, colored, a driver; a boy. January 27, 1892. Slipped from a car in motion, wheels passed over his arm and broke it. Lost some six weeks; fully recovered. "Was whipping and running mule in mines contrary to orders. He was in front of loaded car instead of being on hind end of car where he belonged."

[At the Reinecke Mine, Rufus Johnson got his thumb mashed by getting it caught between two mine cars.]

#### KNOX COUNTY.

Total noteworthy accidents reported. . . . . 1

*North Jellico Mine.*—Gilbert Hoffer, a machine runner. February 25, 1891 (?). Left arm broken by fall of slate. Fully recovered.

#### LAUREL COUNTY.

Total noteworthy accidents reported. . . . . 8

Serious . . . . . 3

Fatal . . . . . 1

*Star Mine.*—Fred. Buckhardt, a miner; an adult. December

3. 1891. Collar-bone broken by fall of slate. Unable to work for three months. "Carelessness in not putting in props."

*Victoria Mines.*—Christian Keller, a boy. February 8, 1892. Returned to room to attend to shot supposed to have missed. Shot fired as he entered room. Slightly bruised. Lost five days.

2. John Munes (or Mims?), an adult. March 2, 1892. Returned to attend missed shot and was suffocated by powder smoke. Recovered from effects and returned to work in three days.

*Allamont Mine.*—Wm. Young, a miner; an adult. July 31, 1891. Killed by fall of slate. "Caused by carelessness in propping." Left widow and two children.

2. Philip Warren, a miner; an adult. (In 1892?) Leg broken by fall of top coal.

3. L. A. Upshaw, a miner; an adult. (In 1892?) Leg broken by fall of top coal.

*Laurel Mine.*—J. W. Bastin, Superintendent Laurel Coal Company. November 6, 1891. Back hurt by fall of slate. Fully recovered.

2. Dave Carr, colored; a driver. November 6, 1891. Head cut and three ribs broken by fall of slate. Fully recovered.

#### LAWRENCE COUNTY.

Noteworthy accidents reported . . . . . 1

*Great Western Mining and Manufacturing Company's Mine.*—Jackson Phelps, a miner; an adult. November 25, 1891. Killed by fall of slate.

#### McLEAN COUNTY.

Noteworthy accidents reported . . . . . 1

*Robinson No. 2 Mine*, of McKenney and Stanley.—Charles Green, a miner; an adult. June, 1892. Injured by fall of top—"one rib broken and one loosened." Lost one week or ten days. Apparently fully recovered.

#### MUHLENBERG COUNTY.

Noteworthy accidents reported . . . . . 4

Serious . . . . . 1

*Mud River Mine.*—William Render, colored ; a driver ; an adult. June 28, 1892. Hand mashed between two cars. Recovered.

2. Alf Lewis, a driver ; an adult. (In 1892 ?) Car jumped track and hurt his ankle. Recovered.

*Powderly Mine.*—James Whinnie, an adult. May 25, 1892. Head cut and shoulder dislocated by fall of coal. Lost one and a half months.

*Central Mine.*—Lawrence Coleman, colored. December 24, 1891. Hurt by being caught between two cars. (It is presumed the "hurt" was not serious.)

(Charles Robinson was slightly hurt October 12, 1891. Seems to have been trivial.)

#### OHIO COUNTY.

Total noteworthy accidents reported . . . . .	3
Serious . . . . .	1
Fatal . . . . .	2

*Taylor Mines.*—Joe Shultz, a driver ; a boy. September 5, 1891. Crushed between cars inside mines. Died December 20, 1891.

2. R. H. Tanner, a miner ; an adult. January 20, 1892. Foot crushed by fall of coal. Lost seven weeks.

*Deane field Mine.*—J. M. Craycraft, Lessee. August 25, 1891. Caught by cage and skull crushed. Killed instantly. Worked outside. Jury's verdict was "negligence" on his part. By many, however, it is thought, from peculiar circumstances, that he died of vertigo, fell, and the cage caught him.

#### UNION COUNTY.

Total noteworthy accidents reported . . . . .	2
Serious . . . . .	1
Fatal . . . . .	1

*DeKoven Slope Mine.*—Jno. Stamps, an adult. May 21, 1892. Was riding down the slope. Cars broke loose by the breaking of a draw-bar, as they were starting, and Stamps was badly injured. Out on crutches at time of operator's report. Several more were slightly hurt. Operator says : "Men are instructed and our rule is for men not to ride *down* the slope."

2. Joe Hudson, a furnace tender; an adult. June 24, 1892. Run over and killed by cars as they were coming out the slope. It is supposed he had a fit and fell across the track just before the cars reached him. He was not beyond daylight. Left a wife and one child.

(Ed. Sheeley was slightly bruised on head by fall of coal in May, 1892.)

[At the Sturgis shaft John Braden was slightly hurt by cage catching one of his feet.]

#### WHITLEY COUNTY.

Total noteworthy accidents reported. . . . .	4
Serious . . . . .	2
Fatal . . . . .	1

*Central Jellico Mine.*—Tom Queener, colored, a driver; an adult. November 6, 1891. Mule ran away. Leg caught between cars and broken. Fully recovered.

*East Tennessee Coal Company's Mine.*—Albert Malair, a miner; an adult. August 15, 1891. Killed by cars breaking loose on incline.

*Main Jellico Mountain Mine.*—Howard Hunter, a miner; an adult. Leg injured by fall of slate. Recovered.

2. Joshua Imes, a miner; an adult. Right leg and spinal column injured by a fall of slate. Recovered.

[Two cases of slight injury were reported from the Breckenridge mines, Hancock county, namely: John Bradly, slightly bruised by fall of roof, and Alex. Caldwell (mine boss), slightly injured on leg and back while directing repairs to roof.]

## VI.

## STRIKES.

During the year ending June 30, 1892, there were eight strikes of a week or more in duration each, and three of less than a week. Five were lost, four were won and two, not terminated at the end of the year, were ended July 11 by what may, perhaps, be called a compromise.

Following is a summary of the strikes :

MINES INVOLVED.	Lost.	Won	Days Lost.
Baskett, May 1, 1891 . . . . .	1	. . .	4
Breckenridge, March, 1892 . . . . .	. . . . .	1	2
Gaines & Read, March 2, 1892 . . . . .	1	. . .	7
Deane's field, Spring 1892 . . . . .	1	. . .	7
Providence, September 8, 1891 . . . . .	. . . . .	1	14
Strunk's Lane, February 1, 1892 . . . . .	. . . . .	1	14
Altamont, February 23, 1892 . . . . .	. . . . .	1	6
Star, December 15, 1891 . . . . .	1	. . .	10
Southern Land Improvement Company, March 14, 1892 . . . . .	1	. . .	63
North Jellico, May 1, 1892 * . . . .	Not settled June 30	. . .	61
General at all Laurel Mines, May 1, 1892 * . . . . .	Not settled June 30		61 for each mine.

In the following descriptive list the statements in quotations are as made by the company reporting :

## BELL COUNTY.

*Southern Land Improvement Company.*—A strike occurred March 14, 1892, and lasted until May 16, 1892. Caused by a reduction of mining rates. Operator says "reduction of rates" was made "on account of reduced rates on contract for product, the rates for mining having been temporarily advanced when contracts for product were made at better prices. Miners acceded to the terms and went to work at the new rate."

\* Settled July 11 by what may be called a "compromise."

**HANCOCK COUNTY.**

*Breckenridge Company, Limited.*—A strike occurred in March, 1892, lasting two days, for an advance of wages. Miners won.

**HENDERSON COUNTY.**

*Baskett Coal Company.*—A strike occurred May 1, 1892, lasting four days, on account of reduction of mining rate. Miners lost.

**KNOX COUNTY.**

*North Jellico Coal Company.*—A strike occurred May 1, 1892, on account of reduction of wages. A settlement was made July 11. Operator says, "miners conceded a reduction." This strike is understood to have been connected with the general strike in Laurel county. See account of that.

**LAUREL COUNTY.**

*At all the Mines.*—A general strike occurred May 1, 1892, caused by a disagreement as to price for mining and narrow work. A comparison of the scales offered by the operators April 26 and June 1, and those offered by the miners, with the scale adopted July 11, indicates a settlement by compromise. It is unnecessary to give the details of the negotiations. The first scale offered by the operators proposed a reduction all along the line including day labor, excepting for run of mines coal, and for driving air-courses and entries and making break-throughs. The miners at first demanded an increase for mining, and then the old rate; the old rate for turning rooms ('to be paid for when room is turned'), an increase for air-courses, entries and break-throughs, and the old prices for day labor. The scale finally agreed upon is the old one. The miners feel that they successfully resisted a reduction; the operators that they successfully opposed a costly advance.

*Star Coal Company.*—A strike occurred December 15, 1891, lasting ten days, based upon a demand for the tipple to be raised. The matter was arranged without the tipple being raised.

*Altamont Coal Company.*—A strike occurred February 23,

1892, lasting six days. Objections were raised to a new bank boss. The objectionable appointment was rescinded.

#### OHIO COUNTY.

*Gaines and Read.*—A strike occurred March 2, 1892, "on account of the dock put on them for loading so much sulphur and bastard coal. Lasted one week. All went back to work" at the old terms.

*Deaneffield Coal Company.*—A strike occurred for semi-monthly pay-days. Lasted one week. Miners lost.

#### WEBSTER COUNTY.

*Providence Coal Company.*—A strike occurred September 8, 1891, lasting fourteen days, on account of the screens. "Miners claimed screen bars were too wide apart and not of right shape. Strike adjusted by company putting in standard screens of flat bars, 1½ inches apart. Old screens were of diamond pattern."

#### WHITLEY COUNTY.

*Pine Knot Coal Company.*—A strike occurred February 1, 1892, lasting two weeks. "Caused by altering dump of coal on the screen bars. Terminated by constructing angle of car when dumped, width and angle of screen, distance between screen bars, precisely the same as at Barren Fork mines."

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## VII.

### LIST OF COMMERCIAL MINES.

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Following is a list of the operators putting out commercial coal, *i. e.*, coal which is shipped to the general market, or which enters the local market in competition with the product of "shipping mines." Mines which are opened but not yet producing are not included. The individual mines are described in the chapter entitled "Notes on the Mines:"

## WESTERN DISTRICT.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Aberdeen Coal and Mining Company . . . . .	Morgantown . . . . .	Butler . . . . .	1	Drift.
Green and Barren River Nav. Co. (mine at Mining City) . . . . .	Bowling Green . . . . .	" . . . . .	2 (Idle)	"
Empire Coal and Mining Company . . . . .	Empire . . . . .	Christian . . . . .	1	Shaft.
Davis & Pike . . . . .	Caseyville, Union county . . . . .	Crittenden . . . . .	1	"
Barnaby & Son . . . . .	Sturgis, Union county . . . . .	" . . . . .	1	Slope.
C. L. Nall . . . . .	Owensboro . . . . .	Daveiss . . . . .	1	Shaft.
New Holland Coal Company . . . . .	" . . . . .	" . . . . .	1	Drift.
Breckenridge Company, limited. . . . .	Cloverport, Breck ridge co. . . . .	Hancock . . . . .	1 (Group)	"
Cooper & Adair . . . . .	Hawesville . . . . .	" . . . . .	1 (Idle)	"
Hawesville Coal Company (at Falcon). . . . .	" . . . . .	" . . . . .	1	"
Henderson Mining and Manufacturing Company . . . . .	Henderson . . . . .	Henderson . . . . .	1	Shaft.
P. J. McNamara . . . . .	" . . . . .	" . . . . .	1	"
Corydon Coal Company . . . . .	Corydon . . . . .	" . . . . .	1	"
Baskett Coal Company . . . . .	Baskett . . . . .	" . . . . .	1	"
T. Shiver & Bro. . . . .	Spottsville . . . . .	" . . . . .	1	"
Clifton Coal Company . . . . .	Mannington . . . . .	Hopkins . . . . .	1 (Idle)	"
Hecla Coal and Mining Company . . . . .	Earlington . . . . .	" . . . . .	1	"
St. Bernard Coal Company . . . . .	" . . . . .	" . . . . .	2	"
" . . . . .	" . . . . .	" . . . . .	1	Drift and Slope.
" . . . . .	Morton's Gap . . . . .	" . . . . .	1	Drift.
J. L. M. Robertson & Son . . . . .	St. Charles . . . . .	" . . . . .	1	"
Oak Hill Coal and Mining Company . . . . .	Earlington . . . . .	" . . . . .	1	"
Madisonville Coal Company . . . . .	Nortonville . . . . .	" . . . . .	1	"
Reinecke Coal Company . . . . .	Madisonville . . . . .	" . . . . .	1	Shaft.
Co-operative Mining and Manufacturing Company . . . . .	" . . . . .	" . . . . .	2 (1 Idle)	"
Crabtree Coal Mining Company . . . . .	Barnsley . . . . .	" . . . . .	1	Drift.
McKenney & Stanley . . . . .	Isley . . . . .	" . . . . .	1	"
Central Coal and Iron Company* . . . . .	Island . . . . .	" . . . . .	2	"
W. H. Dovey, Manager Dovey's Kentucky Mines (John Henry Mine) . . . . .	Central City . . . . .	McLean . . . . .	3 (2 Idle)	Shafts and Slope.
Lessee Memphis Coal and Mining Company . . . . .	Mercer Station . . . . .	Muhlenberg . . . . .	1	Shaft.
Mud River Coal, Coke and Iron Company . . . . .	Central City . . . . .	" . . . . .	1 (Idle)	"
	Bevier . . . . .	" . . . . .	2 (1 Idle)	Shaft and Drift.
	Mud River . . . . .	" . . . . .	1	Slope.



## REPORT OF INSPECTOR OF MINES.

## WESTERN DISTRICT—Continued.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Greer River Coal and Mining Company.	Drakesboro . . . . .	Muhlenberg . .	3 (2 Idle)	Shaft and Slopes
J. Wm. Jones, Lessee Green River Coal and Mining Co.	Paradise . . . . .	" . . . . .	1	Drift.
Hillside Coal Company . . . . .	Mercer Station. . . . .	" . . . . .	1	Shaft.
Greenville Mining and Manufacturing Company . . . . .	Powderly . . . . .	" . . . . .	1	"
Gen. D. C. Buell . . . . .	Paradise . . . . .	" . . . . .	1 (Idle)	Drift.
McHenry Coal Company. . . . .	McHenry . . . . .	Ohio . . . . .	1	Slope.
" . . . . .	Echols . . . . .	" . . . . .	1	Shaft.
Taylor Coal Company . . . . .	Taylor Mines . . . . .	" . . . . .	1	Drift.
Central Coal and Iron Company . . . . .	McHenry (Hamilton) . . . . .	" . . . . .	1	Slope.
Gaines & Read . . . . .	Fordsville . . . . .	" . . . . .	2	Drift.
D. S. Miller, Lessee Etna Colliery . . . . .	Etnaville . . . . .	" . . . . .	1	"
Worrall Mountain Coal Company. . . . .	Reynolds Station. . . . .	" . . . . .	1	Shaft.
Williams Coal Company. . . . .	McHenry . . . . .	" . . . . .	1	"
Wm. Mercer ("Emporia") . . . . .	" . . . . .	" . . . . .	1 (Idle)	Slope.
C. B. Sanders ("Josephine") . . . . .	Reynolds Station. . . . .	" . . . . .	1	Drift.
Ohio Valley Coal and Mining Company. . . . .	DeKoven . . . . .	Union . . . . .	3	Shaft.
Sturgis Coal and Coke Company . . . . .	Sturgis . . . . .	" . . . . .	1	Slopes.
" . . . . .	" . . . . .	" . . . . .	2 (Idle)	Slopes.
" . . . . .	" . . . . .	" . . . . .	1	Slope.
Cumberland Coke Company . . . . .	Uniontown . . . . .	" . . . . .	1	Shaft.
B. C. Davidson . . . . .	Providence . . . . .	" . . . . .	1	Shaft.
Providence Coal Company. . . . .	" . . . . .	Webster . . . . .	2	Shafts.

\*Also Lessees of Muhlenberg, Richmond and the Green River Mines, Muhlenberg county. All idle.

## SOUTHEASTERN DISTRICT.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Central Appalachian Company, Lessee	Pineville	Ball	2	Drifts.
Breckenridge and Pineville Syndicate	"	"	3	"
North Jellico Coal Company	Grays	Knox	1	"
W. A. Pugh	Pittsburgh	Laurel	2	"
Peacock Coal Company	"	"	1	"
Union Coal Company	"	"	1	"
Pitman Coal Company	"	"	2	"
Victoria Coal Company	"	"	1	"
Wm. Welsh, Lessee	"	"	1	"
Laurel Coal Company	"	"	2	"
Nickel Plate Coal Company	East Bernstadt	"	2 (1 Idle)	"
Star Coal Company	"	"	1	"
C. Crooke ("Guy City")	"	"	1 (Idle)	"
J. McNeil ("Buckeye")	"	"	1 (Idle)	"
Black Diamond Coal Company	"	"	1 (Idle)	"
Litton Coal Company	"	"	2	"
H. C. Thompson	"	"	1	"
Altamont Coal Company	"	"	8	"
Lily Mining and Manufacturing Company	"	"	2	"
Livingston Coal Company	Livingston, Rockcastle Co.	"	1 (Idle)	"
Richmond Coal Company	Alpine	Pulaski	2	"
Barren Fork Mining and Coal Company	Flat Rock	"	1	"
Greenwood Railway and Coal Company (Beaver Creek)	Greenwood	"	1 (Idle)	"
Greenwood Coal Company, Lessee	"	"	1 (Group)	"
Mitchell Coal and Mining Company	Pine Hill	Rockcastle	1	"
Pine Hill Coal and Iron Company	"	"	1	"
Procter Coal Company	Red Ash	Whitley	1	"
East Tennessee Coal Company	Jellico, Tenn.	"	2	"
Main Jellico Mountain Coal Company	Kensee	"	1	"
Central Jellico Coal Company	Pleasant View	"	3	"
Pine Knot Coal Company	Strunk's Lane	"	1	"
Jellico Coal Mining Company	Mountain Ash	"	1	"

## NORTHEASTERN DISTRICT.

NAME OF OPERATOR.	Post-office.	County.	Number of Banks.	Character.
Ashland Coal and Iron Railway Co. (at Kilgore and Rush)	Coalton	Boyd	2	Drifts.
Kentucky Union Land Company	Jackson	Breathitt	1	"
Lexington and Carter County Mining Company	Music	Carter	2	"
"	"	"	1	"
"	Mt. Savage	"	1	"
Strait Creek Coal Company	Denton	"	1	"
Willard Coal Company	Willard	"	1	"
Eastern Kentucky Railway Company	"	"	1	"
Mary Coal Company	Denton	"	2	"
Norton Iron Works (at Kilgore)	Ashland, Boyd county	"	2	"
Kentucky Cannel Company (at Music)	Louisville	"	1	"
Eastern Kentucky Railway Company	Greenup	Greenup	1 (Group)	"
White House Cannel Coal Company	Myrtle	Johnson	1	"
Sandy River Cannel Coal Company	"	"	1	"
Great Western Mining and Manufacturing Company	Peach Orchard	Lawrence	2	"
Torchlight Coal Company (at Torchlight Station)	Ashland	"	2	"
Beattyville Coal Company	Beattyville	Lee	1 (Idle)	"
T. J. Phillips	"	"	1	"
Avent Beattyville Coal Company	"	"	1	"
Colvin Coal Company	Bethel, Bath county	Magoffin	1	"
W. T. Dennis	Rothwell	Menefee	1	"
J. M. Brown	"	"	1	"

## VIII.

## LIST OF LOCAL MINES.

The term "local" is used with reference to those mines the output of which is not sold beyond the limits of the immediate neighborhood, or which does not enter the local market in competition with the product from "shipping mines." Some of the Local Mines are at times subject to inspection, but the number is necessarily very variable. It is not presumed that the list is complete; under present conditions it is not possible to present a complete list.

The "Directory of Neighborhood Banks" which has been given in two preceding Reports, having served its purpose, is omitted from this Report, since it would now only increase the bulk of the book without answering any useful purpose. It may be revived, in revised form, should it appear desirable to do so, hereafter:

## Western District.

NAME OF MINE.	Post-office.	County.
A. R. Brucks . . . . .	Owensboro . . . . .	Daveiss.
R. C. Fuqua . . . . .	" . . . . .	"
M. P. Mattingly . . . . .	" . . . . .	"
Bon Harbor No. 1. } Meis & Shafer. . . . .	" . . . . .	"
Bon Harbor No. 2. }	" . . . . .	"
E. Parson's . . . . .	" . . . . .	"
Robert E. Patrick . . . . .	" . . . . .	"
J. H. Rudy . . . . .	" . . . . .	"
Ben. T. Birkhead. . . . .	" . . . . .	"
M. W. Hamilton. . . . .	Whitesville . . . . .	"
G. W. Mullen's . . . . .	" . . . . .	"
J. A. Bartlett . . . . .	" . . . . .	"
J. Dunn . . . . .	" . . . . .	"
J. B. Burton. . . . .	" . . . . .	"
Geo. N. Bowman . . . . .	" . . . . .	"
James Wilkinson. . . . .	Philpot . . . . .	"
Jas. H. H. Williams . . . . .	" . . . . .	"
Wm. Phillips . . . . .	" . . . . .	"
Gallatin's . . . . .	" . . . . .	"
A. Kohlenberg's . . . . .	Panther . . . . .	"
Iglehart's . . . . .	" . . . . .	"
Wm. James . . . . .	Utica . . . . .	"
B. F. Davis . . . . .	Empire . . . . .	Christian.
New Hope (D. W. Sloan) . . . . .	Cloverport, Breck'ge co. . . . .	Hancock.
Henry Allen . . . . .	Hawesville . . . . .	"

## Western District—Continued.

NAME OF MINE.	Post-office.	County.
Joseph Nichols . . . . .	Hawesville. . . . .	Hancock.
C. C. Younger . . . . .	" . . . . .	"
R. E. Duncan . . . . .	" . . . . .	"
Charles H. Rice . . . . .	" . . . . .	"
Joseph Kennedy . . . . .	" . . . . .	"
Henry C. Wilson. . . . .	" . . . . .	"
Wm. Richardson. . . . .	Lewisport . . . . .	"
John Beauchamp. . . . .	" . . . . .	"
Thos. Priest . . . . .	" . . . . .	"
Jo. C. Pell. . . . .	" . . . . .	"
Thos. Davidson . . . . .	Hawesville. . . . .	"
S. W. Moss & Co. . . . .	Zion . . . . .	Henderson.
J. H. Masoncup & Co. . . . .	Hanson . . . . .	Hopkins.
Dr. H. H. Whitson. . . . .	Sacramento . . . . .	McLean.
Alva Karnes. . . . .	Island . . . . .	"
W. W. Hicks . . . . .	Livermore . . . . .	"
B. C. Whitaker . . . . .	" . . . . .	"
J. R. Elliott . . . . .	Calhoen . . . . .	"
"Bates Mine" . . . . .	Rumsey . . . . .	"
Samuel Conway . . . . .	" . . . . .	"
Foley & Van Tress. . . . .	South Carrollton . . . . .	Muhlenberg.
G. W. Doss . . . . .	" . . . . .	"
Galen Gentry . . . . .	Fordsville . . . . .	Ohio.
F. M. Pettey . . . . .	" . . . . .	"
John Johnson . . . . .	" . . . . .	"
Justin Simpson . . . . .	Etnaville . . . . .	"
George Bellamy . . . . .	" . . . . .	"
Jesse Taylor . . . . .	" . . . . .	"
W. Milligan. . . . .	" . . . . .	"
B. R. Kelley . . . . .	Fordsville . . . . .	"
F. B. Payne . . . . .	Providence . . . . .	Webster.
Henry Simmons . . . . .	Darby . . . . .	Warren.

## Southeastern District.

NAME OF MINE.	Post-office.	County.
Gen. T. T. Garrard. . . . .	Manchester . . . . .	Clay.
Wm. Owens . . . . .	Mt. Vernon . . . . .	Rockcastle.
W. Hansel . . . . .	Pine Hill . . . . .	"
J. D. Hall . . . . .	" . . . . .	"
Frank Seward . . . . .	Jellico, Tenn. . . . .	Whitley.
J. G. Sharp . . . . .	Rockhold . . . . .	"
Sharp Berry . . . . .	" . . . . .	"
C. M. Chestnut . . . . .	Woodbine . . . . .	"
S. B. Hart. . . . .	" . . . . .	"
Wm. Perkins . . . . .	" . . . . .	"
The Blevins . . . . .	Jellico, Tenn. . . . .	"

**Southeastern District.**

Page 81.—Top of page. For "*Southeastern District*," read "*Northeastern District*."

G. W. Lansdowne . . . . .	" . . . . .	"
R. C. Lewis & Bro. . . . .	" . . . . .	"
James Osenton . . . . .	" . . . . .	"
W. B. Everman . . . . .	" . . . . .	"
James Fargo . . . . .	" . . . . .	"
James H. Savage . . . . .	Greenup . . . . .	Greenup.
Brown & Brown . . . . .	Grayson . . . . .	Carter.

**IX.****NEW AND OTHER MINES.**

During the inspection year ending October 1st, 21 new mines, representing 14 new operators (companies or individuals) were opened, all for commercial purposes. They are distributed among the Districts as follows: Western, 7 mines, 4 operators; Southeastern, 8 mines, 5 operators; Northeastern, 6 mines, 5 operators.

One group of mines was added to those that are subject to inspection.

There were, therefore, 22 mines added to the inspection list.

Four mines which were idle during the whole or part of the preceding year were reopened—2 in the Western and 2 in the Northeastern District.

Nine mines suspended operations—4 temporarily, to be reopened at an early day; 3 indefinitely and 2 finally. One mine included among the newly-opened ones in 1891 barely more than reached the initial stage when work upon it was suspended.

Following are

**THE NEW MINES.**

1. *The New Holland*, at Mattingly, Daveiss county. This mine was opened about October 1, 1891, by Mr. D. W. Sloan;

and on December 1, 1891, the New Holland Coal Company, with H. G. Simmons and D. W. Sloan as incorporators, was organized. First shipments were made in October, 1891. The mine is on the Louisville, St. Louis & Texas Railroad. See "Notes on the Mines."

2. *The Sturgis Shaft*, at Sturgis, Union county. The shaft was completed October 16, 1891, by the Sturgis Coal and Coke Company. First shipments were made March 17, 1892. The mine is on the Ohio Valley Railroad. See "Notes on the Mines."

3 and 4. *The New Pitman*, near Pittsburgh, Laurel county. There are two mines here, opened by the reorganized Pitman Coal Company. The old company closed down the old "Woods Creek" works on January 14, 1892. The work of opening the new banks was commenced November 16, 1892, and the first shipments in cars loaded at the mines were made in January, 1892. See "Notes on the Mines."

5. *The Colvin Mine*, near Salyersville, Magoffin county. This is a cannel mine, opened by the Colvin Coal Company, composed of Messrs. John Smoot, J. M. Gossett, Sim. Evans and John Wilson, and perhaps others. The post-office address of the company is Bethel, Ky. The mine, opened in 1892, has not been worked continuously. The cannel is reported by Mr. Gossett to be 36 to 40 inches thick. Shipments are made by Licking river. About 400 tons were sent down the river during the six months ending June 30, 1892.

6. *Barnaby's Mine*, near Sturgis, Union county. A slope has been opened in order that shipments may be made by Tradewater river. See "Notes on the Mines."

7. *De Koven No. 9 Mine*, near De Koven, Union county. This is a slope opened by the Ohio Valley Coal and Mining Company. Work upon it was commenced the latter part of 1891. See "Notes on the Mines."

8. *East Kentucky Railway Co.* This company has a number of miners engaged here and there on its property in Greenup county, mining the "Hunnewell" cannel. This work was commenced in the autumn of 1891.

9 and 10. *The Torchlight Mines*. Col. J. H. Northup has opened two mines, one of cannel and one of bituminous coal, in

Lawrence county, on the Ohio and Big Sandy Railroad, six miles south of Louisa. Work was commenced in July, 1892, and first shipments were made in September. See "Notes on the Mines."

11. *The Mountain Ash Mine*, at Mountain Ash (Merthyr Station), in Whitley county. This mine has been opened in the Jellico coal by the Jellico Coal Mining Company. See "Notes on the Mines."

12. *The Breckenridge and Pineville Syndicate, Limited* (present owner of the Cumberland Valley Colliery Company's properties and leases), has opened a cannel mine near West Pineville, Bell county. The bed is a compound one of cannel and bituminous. The company expects to be shipping on a commercial basis by January, 1893. See "Notes on the Mines."

13. *The Little Fork Coal and Land Company* has opened a bituminous mine at Anglin, Carter county. The company was formed December, 1891, and shipments were made in August, 1892. The coal is reported to be four feet thick. From eight to ten miners are employed. The officers are: J. W. Lyttle, President; W. A. Newton, Vice President; M. L. Beall, Superintendent; Miss Mamie Lyttle, Secretary and Treasurer. The principal office is Lexington, Ky. Address of mine is Anglin, Carter county.

14. *The Pittsburg Coal Company* has opened a mine in the "Laurel seam," near Pittsburgh, Laurel county. In August the property was leased for ten years by Mr. Wm. Welsh, recently engaged in mining at Pine Hill. Material progress has been made towards preparing for a large business, in the way of erecting houses and railroad bins. It is expected that arrangements for supplying the bins and making shipments direct from the mine—which is reached from the "Knoxville Branch" by a narrow gauge road one mile long—will be completed by November 10th. About 13 miners are now employed.

15. *The Hawesville Coal Company* has opened a drift mine on the land of Mrs. J. L. Greathouse, near Falcon Station (L., St. L. & Texas R. R.), in Hancock county. Work was commenced in March, 1892, and the first shipments were made on July 13. The company controls 220 acres. The coal is three feet thick. At present 17 miners are employed; it is expected



to employ 50 later on. The officers of the company are: W. S. Morrison, President; John S. Adair, Superintendent; I. C. Adair, Secretary and Treasurer. Principal office, Hawesville.

16. *Messrs. McKenney & Stanley* are opening a shaft mine near Island, McLean county. See "Notes on the Mines."

17. *Mr. C. B. Sanders* has opened a mine, the "Josephine Colliery," near Reynolds Station, in Ohio county. Mr. A. D. Powers is Superintendent. The work of opening commenced May 26, 1892. First shipments were made September 10th. Eighteen persons are employed inside and six outside. The coal—one of the lower seams—has an average thickness of 40 inches, the thickness ranging from 36 to 44 inches.

18. *The Altamont Coal Company* has opened, and is now developing, a new mine, on the Altamont & Manchester Railroad, about two and a half miles eastwardly from Altamont Station. The preliminary work was begun in May. No shipments have been made. The coal ranges from 38 to 42 inches in thickness.

19. *The Kentucky Cannel Company* has purchased 1,200 acres of land on Stinson creek, immediately adjoining the cannel mines of the Lexington & Carter County Mining Company, near Music. Mr. G. Macfarlane is President of the company. Mines are now being developed. It is expected, early in 1893, to construct a branch railroad from the mines to the Chesapeake & Ohio Railway, at E. K. Junction, or to the Eastern Kentucky Railway, at Grayson. The coal is known in the market as the "Old Kentucky Boghead."

20. *Mr. H. C. Thompson* has opened, and is now developing, a mine on land of the Altamont Coal Company, near that company's new mine. Shipments are expected to be made December 1st, or thereabout.

21. *Mr. J. M. Brown* is developing a mine near Rothwell, Menefee county, preparatory to operating on a considerable scale. As a necessary preliminary, he is building an extension of the Kentucky and South Atlantic Railroad. The total extension will be six miles. It was expected to have the road completed by September 1st.

22. *The Southern Land Improvement Company* has opened a new mine in the bed that lies about 200 feet above the Pineville seam. The opening is in the mountain directly above the

company's No. 1 Mine, above the Left Fork of Straight Creek. An incline has been built to bring the coal to the tippie which now serves for No. 1 Mine, but is not yet equipped.\* The openings which had been made by the Pine Mountain Coal and Iron Company in the same bed have been discarded.

#### REOPENED MINES.

1. *Dovey's Kentucky Mine*, at Mercer Station, Muhlenberg county, which was temporarily shut down in July, 1891, was reopened in December of the same year.

2. *The Dry Fork Mine*, near Willard, in Carter county, was reopened in the autumn of 1891, again suspended in February, 1892, and was again reopened in August.

3. *The Great Western Mining and Manufacturing Company* reopened its "Annie" Mine, at Peach Orchard, Lawrence county, in January, 1892. The mine had been idle for about two years.

4. *Lamb's Mine*, in Crittenden county, near Caseyville, practically suspended in March, 1891, was reopened in the winter of 1891-'92.

#### SUSPENDED MINES.

1. *The Slip-Up Mine*, in Pulaski county. Suspension indefinite. Employed only a few miners.

2. *Cumberland Valley Colliery No. 2*. Temporarily suspended. Shut down at the close of the first half of 1891. May be reopened by the present owners, the *Breckenridge and Pineville Syndicate, Limited*.

3. *The Hathaway Mine*, Menefee county. Temporarily idle.

4. *The Layman Mine*, near Sturgis, Union County. Indefinitely suspended on April 1, 1892, upon its purchase by the Sturgis Coal and Coke Company, the company intending to concentrate its work at its shaft and the Tate slope.

5. *The Pitman Company's "Woods Creek" Mine*, at Pittsburgh, Laurel county. Abandoned January 14, 1892—exhausted.

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\*This property is now controlled by the Central Appalachian Company, Limited, and the No. 2 Mine is being developed and equipped for mining operations.—November 19, 1892.

6. *The Laurel Coal Company's No. 1 Mine*, near Pittsburgh, Laurel county. Indefinitely suspended in March, 1892—probably nearly exhausted—the company concentrating work at Mine No. 2.

7. *The Mitchell Coal and Mining Company's Mines*, near Pine Hill, Rockcastle County. Abandoned in July—practically exhausted.

8. *Tate's Slope*, near Sturgis, Union county, now the property of the Sturgis Coal and Coke Company. Temporarily suspended June 23, 1892.

9. *The Worrall Mountain Mine*, at Reynolds Station, Ohio county, under lease to J. H. Allen. Suspended May 10, 1892. May resume in the spring of 1893.

#### PROPOSED MINES.

The following propose to have mines in operation within the coming year :

1. *The Jellico and Birdeye Coal Company*, a co-operative organization, with a capital stock of \$650,000, is preparing to open mines in the Jellico region of Whitley county. A railroad seven miles in length, from Jellico to the coal openings, is now in process of construction. It is probable that sufficient progress for mining operations will have been made by the spring of 1893. Latest official advices (August, 1892,) were not definite as to the future operations of the company. Mr. E. T. Halsey, Vice-President of the Columbia Finance & Trust Company, of Louisville, is President. The company controls a large and valuable coal property, in which are included large areas of the Jellico coal and of the bed known as the Birdeye seam. The excellence of the Jellico coal has been firmly established in all markets to which it has been sent. The Birdeye seam ranges in character from a soft bituminous coal to an uncommonly beautiful semi-cannel, from the peculiar structure of which the specific name is derived. Both coals are noticed more particularly elsewhere in this Report.\*

\* Recent information is to the effect that such progress has been made with the road and mines that shipments may be expected to be made next spring.—November 19, 1892.

2. *Mr. Alva Karnes* has expected to have his mine near Island, McLean county, hitherto operated solely for "country" trade, connected with the Owensboro & Nashville Railroad by tramway by November 1st. There have been some delays consequent upon difficulties encountered with respect to right-of-way, and it is probable that the projected development of the mine into a shipping one will not occur before 1893.

3. *The Cumberland Coal Company*, of Sturgis, Union county, will reopen the "Miners' Shaft" mine. It was expected that this would be done in time for the winter trade, but it is now probable that the work will be postponed until the coming year. The shaft is 218 feet deep. The coal is one of the lowest beds, if not the lowest workable seam, in the Western coal-field, being the one designated in Dr. D. D. Owen's Geological Reports as the "Bell Coal." The mine, which has not been worked for a number of years, is now full of water.

4. *The Old Highland Coal Company Mine*, at Uniontown, Union county, now owned by Judge W. P. D. Bush, of Louisville, Ky. The prospects for putting this mine, which has been idle a number of years, in operation on an extensive scale early next year are encouraging. The coal here, the same bed as that worked at the Uniontown mine of Davidson & Son, is nearly 6 feet thick, and is of excellent quality. There are about 4,000 acres of land, probably all underlaid by coal, attached to the mine.

5. *The Arent Beattyville Coal Company*, in Lee county, is preparing to make shipments when the Winchester & Beattyville R. R. is completed. The company has control of the mines formerly worked by Hon. John G. McGuire, on Upper Stufflebean creek, and shipments are expected to commence by next February. The road will connect with the Kentucky Union at the Walker's creek bridge, a distance of about seven miles, and is under contract to be completed by January 1, 1893.\*

6. *Messrs. Hewitt, Norman & Co.*, of Frankfort, Ky., have about 500 acres of the "Beattyville Coal" in the ridge between Mike's branch and Contrary creek, west of the Beattyville Coal Company's mine, which will probably be developed

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\* The railroad has been completed, and was opened for traffic about the middle of December. Some small shipments of coal have been made over it—January, 1893.

within the coming year. Here the "Beattyville Coal" attains its maximum thickness (reported measurements ranging from 48 to 52 inches), and is of exceptional excellence. For many years the coal was known in the Kentucky river markets as the "Baker Coal" and was regarded with great favor. The position of the coal bed and the topography are favorable for economical mining, and transportation by rail may readily be secured. Connection may be made with the Winchester and Beattyville Railroad by a track (the bed for which is already graded) about one mile and a half in length. When completed, the Richmond, Nicholasville, Irvine and Beattyville Railroad will pass along the front of the property.

7. *The Log Mountain Coal, Coke and Timber Company*, of Pineville, Ky., has made some progress towards opening its coal properties in Bell county. Active development is expected to follow the completion of the line, twelve miles long, to be built up Clear Creek by the Louisville and Nashville Railroad Company. The construction of the road is expected to commence some time in November and be completed in April, 1893. The Log Mountain Coal, Coke and Timber Company will itself work the cannel bed (46 inches thick) on its property; but the principal part of the mining is expected to be done by lessees. The company has made about eighty openings in the coals within its territory.

8. *The Maysville Cannel Coal Company* will probably undertake the development of its property in Johnson county, near East Point, in the near future. It was expected that the preliminary work of driving entries, etc., would already have been under way, but up to latest advices (August 9th) nothing had been done. The bed to be opened is a cannel, reported to range in thickness from 46 to 60 inches. Shipments will be made by the Levisa Fork of the Big Sandy river. Officers of the company are Henry Ort, President; E. H. Martin, Secretary and Treasurer. Principal office, Maysville, Ky.

9. *The Monarch Coal and Coke Company* has secured a large acreage of the "Elkhorn" coal, in Pike county, and it is announced that the work of developing the property—to include the opening of mines and the construction of coke ovens—will be commenced in the near future. It seems probable that work

will be under way by the summer of 1893. The "Elkhorn" coal is here in its typical thickness and excellence. It is announced that docks will be built at Superior, Wis., and that point made a distributing point for the coke made here. A necessary preliminary to this company's operations is the construction of a railroad to Pike county, and when this is done one of the very most important steps towards the development of the Eastern coal field will have been made. The railroad connections may, possibly, be secured by an extension of, or an independent line to, the Ohio and Big Sandy Railroad, the distance to be covered in such event being about fifty-five miles.

10. *The Morgan County Cannel Coal, Land and Lumber Company* has secured about 6,000 acres in Morgan county, and will probably commence the development of a cannel seam upon it within the coming year. The seam is reported to range from 31 to 48 inches. It is known as the "Maynhier" bed, the analysis of which is as follows:

Moisture . . . . .	2.30
Volatile combustible matter . . . . .	41.60
Fixed carbon . . . . .	44.70
Ash . . . . .	11.40
	<hr/>
	100.00
	<hr/>
Sp. gravity . . . . .	1.331
Sulphur . . . . .	1.271

The sample analyzed was from a layer of cannel 26 inches thick, taken at the Maynhier bank. The development of the property will necessarily wait on the provision of transportation facilities. The nearest railroad station is Morehead; the nearest post-office is West Liberty. Several railroads are projected into the section, among them the Midland, by way of Mt. Sterling, or by Owingsville. A road from Morehead, on the Newport News and Mississippi Valley (E. D.), would reach the coal within a distance of eighteen or twenty miles, and has been discussed. From a gentleman connected with the coal company it is learned that something definite with regard to a railroad to the section will be done in 1893, and they confidently expect construction to be

~~commenced~~ before the year is out. Officers of the company are John Meagher, President; A. W. Overton, Secretary and Treasurer. Principal office, Frankfort, Ky.

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## X.

### KEYS TO THE COAL FIELDS.

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According to the latest published determinations of the State Geological Survey, Kentucky has an aggregate of 15,680 square miles of coal-bearing measures. As is well known, there are two distinct fields, comprising a portion of the Appalachian, in the East, and a part of the Illinois, or Central, in the West. The areas of the two fields are as follows :

Eastern Field, square miles . . . . .	11,180
Western Field, square miles . . . . .	4,500
	<hr/>
Total square miles . . . . .	<u>15,680</u>

It will be seen that the State has between one-fifth and one-sixth of the Appalachian Field, and between one-tenth and one-eleventh of the Central Field. A very large percentage of each field is productive, but, in consequence of the comparatively small amount of mining that has been done in the State, the area of easily accessible coals being considered, just what proportions are underlaid by workable coals have never been determined.

Although each field contains from six to eight usually workable seams,\* the larger part of the product at present mined in each District is derived from two or three beds.

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\* This statement should not suggest the idea that there are only that many distinct coals which may be worked in each field. In some portions of each field beds which are not workable in others reach great thickness, and are among the most desirable seams to be found.

For the convenience of this Office, in part, and in part because of differences in the natural markets for certain mines, the coal-fields have been divided into four Inspection Districts; namely: The Western, including the entire Western Field, and the Northeastern, the Southeastern and the Elkhorn, in the Eastern Field.

### THE WESTERN FIELD.

Although the longest known field, and the recipient of perhaps the larger part of the attention of the first Geological Survey, and of a large share of the work of the second one, less is really known about the details of the coal seams here—less is known concerning their persistency and individual characteristics—than is true of the beds in the less developed Eastern Field. This is due, in part, to the fact that the geology is usually masked, and in part to a misapprehension of the characteristics of the coal deposits. There are few hills of considerable altitude, and there are no deep gorges; bold exposures are rare, and the geology is much complicated by difficultly-traced faults. The difficulties and eccentricities of the field were discounted by officers of the first Survey, and conclusions were reached which, proving erroneous in some instances, have been a source of confusion to all who have been unable to find a middle ground between the full acceptance of them and their total rejection. Many of the errors of the first Survey remain uncorrected, and a large part of the field is, therefore, still unknown ground—full of puzzles—to the average prospector, who may enter it with the reports of Dr. Owen in one hand and the incorrect “corrections” of them, by his Indiana and Illinois critics, in the other.

No attempt will be made in this Report to present a definite correlation of the coals of Kentucky, Indiana and Illinois, as has been tried by Prof. E. T. Cox, late State Geologist of Indiana, and Prof. A. H. Worthen, formerly State Geologist of Illinois. To do so successfully would require more information concerning the details of each State—especially of the Kentucky measures—than any one yet possesses; and it seems probable that the conclusions of Cox and Worthen, concerning portions of their own respective fields, would require revision be-



fore they could be made available for the compiler working with Kentucky data.

The efforts of Cox and Worthen ended in their utter rejection of the Kentucky Section of Owen, and the subsequent construction of one, each, by themselves, which they believed (largely from "reasoning" rather than from observation) would serve better. In doing this they committed grave errors, which have served only to lead others astray. It is quite possible that had they known the characteristics of their own fields better at the time, they would have been more successful.

Prof. Cox, in a paper read before the American Association for the Advancement of Science, in 1871, and embodied in his second Report as State Geologist of Indiana (for the year 1870), page 166, *et seq.*, says: "From observations made in the Western Coal Fields, during the past three years, over portions of Southern Illinois, Western Kentucky and Indiana, so many errors have been found in the sections of the strata given in the third Kentucky Report, and which were pretty generally copied by other Geologists in more recent Reports, that I have found it necessary to make an entirely new classification of the coals of the West. In speaking of the errors in Dr. D. D. Owen's section of the Western coals, I do not want to be understood as referring to the errors of the sections published in the first and second Reports on the Geology of Kentucky, as some have supposed from reading the remarks on the subject made in my first Report on the Geology of Indiana, 1869, but to the subsequent general section to be found at pages 18-24, in the Third Volume Kentucky Report, published in 1857, in which some of the most glaring errors of the previously published sections are omitted."

Mr. Cox then "presents a column of the Kentucky coals as corrected by himself," which shows only nine coals above the "Millstone Grit," and is as follows:

	Feet.	Inches.
1. "Anvil Rock" . . . . .	118	
2. Shale and thin coal . . . . .	3	
3. Space. . . . .	36	8
4. Coal No. 8 . . . . .	2	
5. Space. . . . .	46	
6. Coal No. 7 . . . . .	5	
7. Space. . . . .	41	

	Feet.	Inches.
8. Coal No. 6 . . . . .	2	6
9. Space . . . . .	65	
10. Coal No. 5 . . . . .	5	
11. Space . . . . .	86	
12. Coal No. 4 . . . . .	2	6
13. Space . . . . .	90	
14. Coal No. 3 . . . . .	3	
15. Space . . . . .	24	
16. Coal No. 2 . . . . .	4	
17. Space . . . . .	140	6
18. Coal No. 1 . . . . .	1	8
19. "Millstone Grit" . . . . .	130	
20. Thin coal . . . . .		3
21. Space . . . . .	65	
22. Coal . . . . .		8

Mr. Worthen, in Volume III., Illinois Geological Survey Reports, page 1, *et seq.*, says :

"On taking charge of the Illinois survey, I thought it important, inasmuch as our coal-field was known to be the northern extension of the Kentucky basin, to establish, if possible, a parallelism between the coals of Illinois and those of Kentucky, as they were represented in the published sections of the Kentucky Reports, in regard to the correctness of which we had entertained no doubt, as they had been constructed under the supervision of that eminent geologist, the late Dr. D. D. Owen, whose reputation as a reliable practical geologist was second to no man's in the West. With this object in view, I secured the services of Prof. Leo Lesquereux, who had been employed in Kentucky, and was consequently familiar with the coals of that State; and, together, we visited, during the summer of 1860, the principal mines worked at that time in our State, examined the coals, making careful sections of the beds with which they were associated, and collected the fossils characteristic of the different groups, and the result of our observations was given in the first volume of the Report. Subsequently we became satisfied that some of the conclusions to which we had been led in regard to the position of some of our coal beds were erroneous, and we were finally compelled to believe, from further investigations,

that the Kentucky section was incorrect; or else no parallelism could be made out between the workable coals of the two States. For example, the *Aviculo-pecten rectilaterarea* (Cox's sp.), with the associated fossils, which in Kentucky was regarded as characteristic of their Coal No. 9, was found in Illinois in a much lower position, and characterizing a coal here which was not higher in the series than their coals No. 3 or 4, of their sections; and furthermore, we became satisfied that all the workable coals in Illinois were restricted to the lower part of the measures, and that we had no coals, except some thin beds of no practical value, that occupied as high a position in the series as Nos. 9 and 11 of the Kentucky section."

[But the fact is, that the principal coals of the Illinois section correspond to the upper coals of the Kentucky column, and that Nos. 5, 6 and 7 of Worthen's section correspond to Owen's 9, 10 and 11. And still there are eight coals below "No. 9" in Kentucky.—C. J. N.]

Mr. Worthen then gives a General Section for Illinois, a part of which is reproduced on Plate I, and continues:

"By comparing the foregoing with the Kentucky section, we shall find that there are no beds in Illinois that can be referred to those in that section intervening between the Mahoning and Anvil-rock sandstones,\* and no sandstones associated with our upper coals that can properly be considered as the equivalent of the upper sandstone of their section, unless it is that over our coal No. 6. Hence, we are inclined to believe that two different

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\*The so-called "Mahoning" sandstone of Owen's section, is a sandstone overlying his "No. 4" coal. Worthen has placed it over "No. 5." The "Anvil-rock" is the sandstone over Owen's "No. 12" coal. The name has no general significance. It was adopted from the local name given to a large fragment of the sandstone in question in Union county, which bears some resemblance to an anvil, and is a well-known landmark near DeKoven. By referring to the sections on Plate I, it will be seen how utterly mistaken Prof. Worthen was in the statement, that "there are no beds in Illinois that can be referred to those in that section intervening between the Mahoning and Anvil-rock sandstones." It may be remarked that the term "Mahoning" is, in fact, meaningless when applied to any sandstone in this field. It was used by Dr. Owen and Prof. Lesquereux, when they supposed that they had succeeded in finding a parallelism between the beds of this field and those of Pennsylvania and Ohio.

outcrops of the same bed of sandstone in Kentucky have been mistaken for distinct beds, occupying different stratigraphical positions, and by adopting this supposition they have increased the thickness of the measures 300 feet or more than they really attain, and nearly doubled the number of their workable coals. That this is the true explanation of the want of parallelism between our section and theirs seems highly probable from the general correspondence of the strata for 300 feet below these sandstones, as illustrated by the subjoined sections of the strata as taken from the Kentucky section :

Anvil-rock SS.	Mahoning SS.
Coal 3 feet.	Coal 4 feet. (b)
Shale 10 feet.	
Coal — feet.	
Shale 40 feet.	Shale 95 feet.
Coal 5 feet.	
Shale 60 feet.	
Coal 5 feet.	Coal 3 feet.
Shale 20 feet.	— 25 feet.
Coal 6 inches.	Thin coal and limestone.
Shale 70 feet.	Shale 130 feet
Coal 2½ feet.	Coal 2½ feet.
Shale 110 feet.	Shale 100 feet.
Coal 3 feet. (a)	Coal 1 foot 8 inches.

“The lower portions of these two sections correspond almost exactly the one with the other, while in the upper part the only variation consists in the intercallation of three beds of coal in the first hundred feet below the Anvil-rock, while there is but one in the same space below the Mahoning. But any one accustomed to working in the coal measures will see at a glance the probable synchronism of the strata in these two sections, for sections could scarcely be made through equivalent beds at twenty miles apart, anywhere in the measures, that would not show quite as marked a variation in the thickness and lithological characters of the strata, as are presented in those just given. Now, if we take from the Kentucky section this upper sandstone and the beds intervening between it and the Mahoning, we have a general correspondence between the sections in Illinois and Kentucky, perhaps as decided as could be expected to occur in remote portions of the same coal-field ; the most important difference being in the aggregate thickness of the strata, a variation for which we have already suggested an explanation.”

Prof. Cox and Prof. Worthen were, perhaps, both misled by their then misconceptions of their own respective fields. Their conclusions as to the Kentucky section, in any event, were certainly wrong; and the peculiarly erroneous "reasoning" followed by Prof. Worthen to demonstrate Owen's inaccuracy is amusingly illustrated by the fact that the coals marked (a) and (b)—by the present writer—in Worthen's "corrected section" are now worked, the one (b) immediately under the other (a), in the Ohio Valley Coal and Mining Company's slope, at De Koven. The distance between them is 41 feet. The other coals indicated above the seam marked (a)—which, known as the "three-foot" at DeKoven, is "No. 6" of Owen—appear in the hills there in such positions as to leave no room to doubt that they are above that coal.

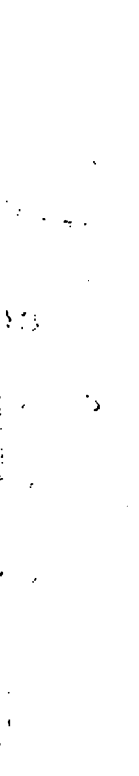
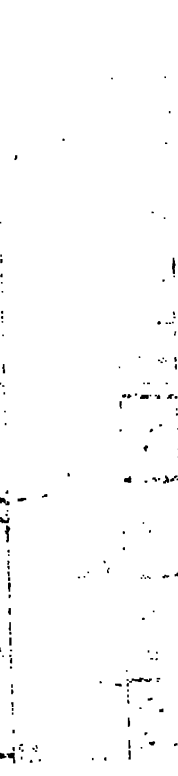
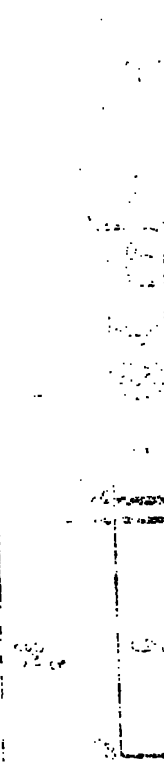
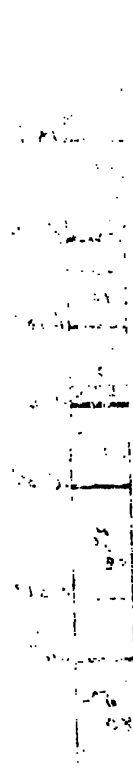
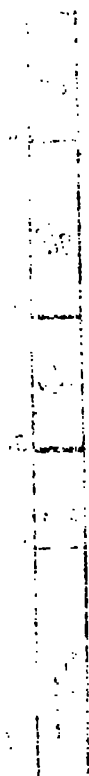
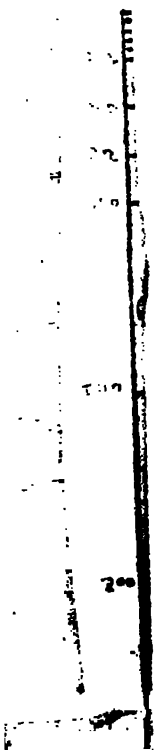
That errors have been made as to the equivalency of beds in various part of this field is undoubtedly true, but the results of investigations made in recent years, not only by myself, but by other and careful observers, and made under the advantages afforded by the increased development of mining, not only prove that there are, unquestionably, more than twelve distinct coal-beds in the Kentucky field, below the "Anvil-rock" horizon, but tend to verify the larger part of the section as constructed by Dr. Owen. Indeed, even though all the errors made by him be taken into account, the general accuracy of Dr. Owen's work, under the disadvantages and limitations environing him, is simply marvelous.

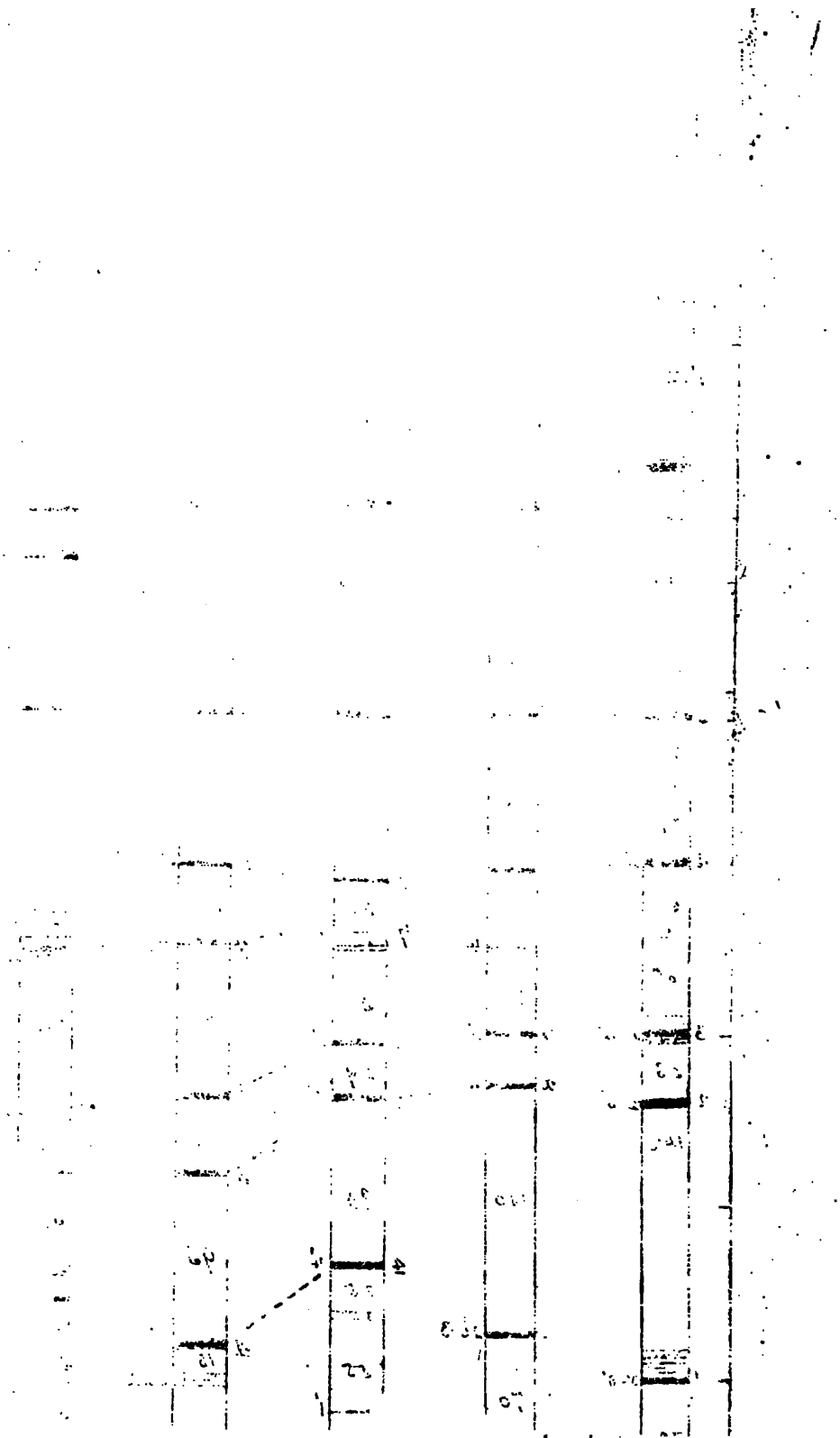
The Section for Union county, which has been verified from "No. 12" coal down to "No. 5," inclusive, and from "No. 1B" up to "No. 3," inclusive—subject to some modifications of intervals here and there—may stand as a key with which to work in the western and northwestern parts of the field, and it is presented for that purpose in Plate I.\*

It is now clear that no single section will serve for all parts of the field—especially with respect to the beds below that known

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\* Of the Illinois Sections shown on the Plate, "A" represents part of Worthen's General Section; "B" is Cox's Section for Gallatin county; and "C" is Owen's General Section of the measures in the Bowlsville region, made for the Shawneetown Coal Company.





as "No. 8" coal. Below "No. 7" the coals are especially erratic.

Certain coals in the lower part of the Kentucky section thin out, or "feather," towards the north and northwest, while others which are poorly developed in this State become the principal beds in Indiana and Illinois, and additional "upper measures" come in. Our "No. 11," for example, is No. 7, and our "No. 9" is No. 5, of Illinois, while certain thin seams of Kentucky, like "No. 10," become important beds in that State. The fact seems to be that, in Indiana and Illinois only the upper part of our section, above the Conglomerate, is well developed, and that it was lack of information on this point which probably misled Messrs. Worthen and Cox, and caused them to discredit the "Kentucky Section."

The idea that a coal found of considerable and notable thickness in one part of the field would necessarily be found in another part, the topography and order of beds permitting, has been the source of many of the erroneous conclusions concerning this coal-field, and has resulted in many disappointments for prospectors. It is now pretty well determined that even the strongly marked beds are not all co-extensive with the field; that seams well developed in the southeast may be absent in the northwest, and *vice versa*. This was suggested as far back as 1875 in the present writer's Report on the Geology of a Part of Ohio county, wherein it was stated: "Even those coals that may be regarded as comparatively constant are not, however, presumed to be present everywhere that their horizons are reached."

It is also pretty clear that some beds are not persistent as workable seams even in limited areas, and that some of them are distributed in pools rather than in even sheets; the "pools," however, not necessarily being the original form of the deposits, but, in some instances at least, being due to stream erosion after the coal had been formed in more or less sheet-like areas—the subsequent deposits of mud and sand filling up the eroded spaces with "shale" and "sandstone." Such eroded spaces may amount to acres in extent, or not exceed a few square feet. It is on this account that, while bore-holes are great helps in the search for coals, a single boring does not furnish absolute proof



that a particular seam is absent from the region in which it is made. The hole may miss the coal, in its workable thickness—pass to one side of it—by only a few inches. This may readily be demonstrated at a mine with which the writer is well acquainted.

The Union county Section, especially from No. 5 upward, *as a basis from which to work*, will serve for the larger part of the entire field.

The Ohio county Section, constructed from observations of the present writer, will serve the same purpose for the eastern and southeastern portions of the field, excepting those in the extreme southeast.

The other sections given on Plates I. and II. will aid in prospecting a large scope of territory lying within the particular part of the field where they were made.

Special descriptions of each of the coals will not now be undertaken, since it is desired and expected to pay attention to this in a succeeding Report. It is sufficient for the present to say that the various coals shown in the plates of sections are worked at the following points :

Coal 1B, of Owen, or L of the Ohio county Section, is worked at Barnaby & Son's mines, in Crittenden county; was worked at Hawesville; and is probably the one worked at Mud River, Empire, and Aberdeen mines.

Of Coal 2, of Owen, little is known. It seems to be the one worked at Deane field. The coal at that place corresponds to Coal K of the present writer, which has been regarded as the equivalent of Owen's No. 2. Coal K varies from nothing to thirty inches in thickness, where well recognized, in the eastern part of the field. It is the coal occurring at 20 feet below the "Bee Spring sandstone," in Edmonson county.

Coal 3, of Owen, is not known by the present writer in the typical locality studied by Dr. Owen. Coal J, of the Ohio county Section, seems to occupy the horizon indicated for it in the Union county Section, with a shortening of the interval from 1B. Coal J is probably the coal worked at the Worrall Mountain and the Gaines mines, in Ohio county. A higher coal was, in a report of the present writer on the "Geology of the Region Adjacent to the Louisville, Paducah and Southwestern Railroad," 1875, referred to this number.



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~~Coal 4~~, of Owen, has not been seen in its typical locality by the present writer. Coal I of the Ohio county Section corresponds to it, perhaps; ~~that~~ coal being, at any rate, the fourth well developed one in ascending series. Coal I is the "Mannington Coal," of Hopkins county, and ~~the~~ "Mason Coal," of Hancock county.

Coal 5, of Owen, is worked at the mines of the Ohio Valley Coal and Mining Company, at DeKoven, in Union county, where it is known as the 3-foot coal. Coal H, of the Ohio county Section, which is worked in the Hawes Hill, near Hawesville, in Hancock county, may correspond to this number. It is a very uncertain coal in the eastern portion of the field.

Coal 6, of Owen, is worked at the mines of the Ohio Valley Coal and Mining Company, in Union county, where it is known as the 4-foot coal.

Coal 7, of Owen, which is F of the Ohio county Section, has nowhere been identified as a workable coal, unless the "Lewisport seam," of Hancock county, occupies this horizon(?)

Coals 8, of Owen, and E and Ea of the Ohio county Section, are not known as workable seams.

Coal 9, of Owen, (D of the Ohio county Section), is the most regular in bedding, the most constant in thickness (56 inches as a rule), and the freest from "troubles," of any in the field—perhaps, of any in the State. It is, in fact, wonderfully uniform in all respects. Probably 75 per cent. or more of the commercial product of this District is derived from this seam.

Coal 10, (C of the Ohio county Section), has nowhere been identified as a workable bed in this field. It is seldom present, usually showing only as a thin smut; but it has been found presenting a thickness of 30 inches, at the Richmond mines, in Muhlenberg county.

Coal 11, (B of the Ohio county Section), ranks next to No. 9 as a source of commercial fuel. It is not a reliable coal, however, since it varies from a soft smutty bed of only 12 inches to a good, solid coal (but always with one or two partings), of 7 feet.

Coal 12, (A of the Ohio county Section), is an excellent coal when well developed, but is seldom found in a suitable condition for mining. When present at all, it varies in thickness.

from three to six feet, sometimes appearing as a mere smut. Its unreliability is such that no dependence is placed upon it by the miners of this field. It is finely developed at Airdrie, near Paradise, in Muhlenberg county, and is of very excellent quality.

The coal shown above No. 12 in the Reinecke shaft and Madisonville sections, (Sections 6 and 7 on Plate I), has occasionally been mistaken for No. 12, and was so designated in his Shawneetown, Ill., section by Dr. Owen. Little is known concerning this coal, or of the other measures above No. 12 coal by the present writer. Part of the section above No. 12 coal may be seen at South Carrollton, Muhlenberg county, and it is quite possible that the rocks in the railroad cut at Rockport, Ohio county, may belong to this part of the section.

Since the foregoing was written, I have been furnished with the following record of a boring recently put down by the St. Bernard Coal Company, at Earlington, Hopkins county. I am indebted to Mr. Ben. W. Robinson, mining engineer for the company, for a copy of the record, by courtesy of Mr. J. B. Atkinson, Vice-President. The boring, in condensed form, has been put on Plate I. It does not appear to coincide satisfactorily with any section or boring with which I am acquainted; comments on it are, therefore, reserved until a future Report. The record, in detail, is as follows:

	Feet.	Inches.
1. Dirt . . . . .	13	
2. Sandstone . . . . .	2	
3. Shale . . . . .	47	
4. Coal . . . . .		8
5. Fire-clay . . . . .	4	
6. Sandstone and shale . . . . .	34	
7. Shale . . . . .	53	7
8. Coal . . . . .		12
9. Fire-clay . . . . .	2	
10. Sandstone and shale . . . . .	24	
11. Sandstone—white . . . . .	20	2
12. Sandstone . . . . .	11	
13. Dark shale . . . . .	11	7
14. Coal. One inch parting. . . . .		30
15. Fire-clay . . . . .	7	6
16. Sandstone . . . . .	17	
17. Shale . . . . .	22	
18. Black shale . . . . .	4	
19. Coal . . . . .		7

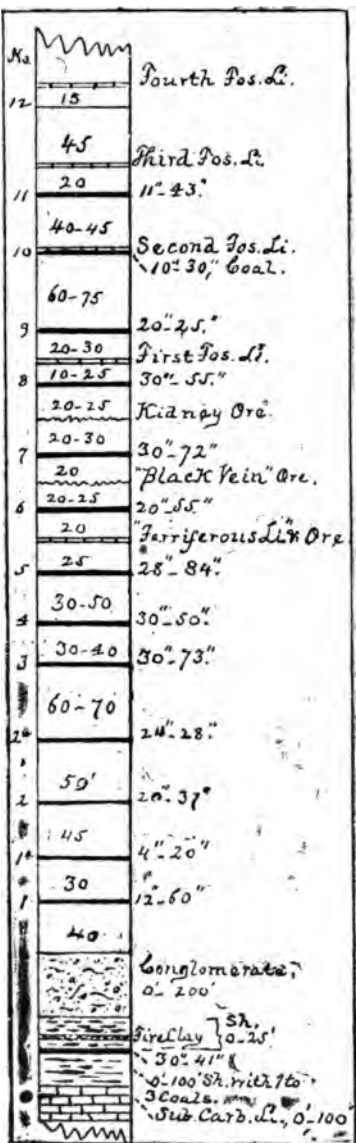
	Feet.	Inches.
20. Fire-clay. . . . .	9	5
21. Sandy shale . . . . .	6	
22. White sandstone . . . . .	58	
23. Sandstone; very coarse and gritty; thin layers of flint; pyrites at bottom . . . . .	27	
24. Hard, gritty sandstone . . . . .	8	
25. Shale; full of fossil impressions . . . . .	4	
26. Sandstone; gritty; some parts very shaly. . . .	13	
27. Shale; very black and hard, with thin layers of coal . . . . .	2	
28. Ferruginous limestone. Full of fossil shells. Upper 6 inches very crystalline and very dark .	3	6
29. Shale; dark . . . . .	15	6
30. Coal . . . . .		8
31. Red sandstone. Is very peculiar; crys'alline; looking somewhat like a limestone. Contains a few irregular coal impressions. Lower 6 inches looks very much like a limestone . . . . .	2	
32. Bluish sandstone; very shaly in some parts. Con- tains some "nigger-heads". . . . .	16	10
33. Sandstone . . . . .	12	
34. Coal . . . . .		1
35. Fire-clay. . . . .	4	
36. Dark shale. . . . .	3	
37. Sandstone . . . . .	3	9
38. Dark shale. . . . .	3	
39. Sandy shale . . . . .	5	
40. Coal . . . . .		3
41. Fire-clay—rasy . . . . .	4	9
42. Dark sandy shale . . . . .	11	9
43. Dark sandy shale. Is full of broken fossil plants, mostly like blades of grasses . . . . .	13	
44. Dark sandy shale . . . . .	8	4
45. White sandstone . . . . .	5	
46. Dark sandy shale . . . . .	3	
47. Sandstone . . . . .	17	
48. Dark shale . . . . .	4	
49. Sandstone . . . . .	4	
50. Sandstone containing thin layers of coal . . . .	7	
51. Dark shale with sandstone partings. . . . .	18	8
52. Dark shale. Is full of fossil plants. Contains thin layers of coal. Splits very easily. . . . .	12	
53. Dark shale. . . . .	14	
54. Bluish sandstone. . . . .	24	
55. Sandstone with bluish shale intermixed . . . .	24	
Total depth of boring . . . . .	645	1

## THE EASTERN FIELD.

The Eastern Field, as previously stated, has been divided, with reference to present and future mining, into three Inspection Districts, namely, the Southeastern, the Northeastern, and the Elkhorn.

*The Northeastern District.* This District includes the counties of Boyd, Breathitt, Carter, Greenup, Johnson, Lawrence, Lee, Magoffin, and Menefee, in which commercial mines are at present in operation; and the counties of Elliott, Estill, Martin, Morgan, Powell, Wolfe, and Rowan.

The accompanying General Section\* will serve not only as a key to the coals of this District, but as a type section for the Eastern Field. It is founded on a condensed compilation, with some additions, of the "General Section for Greenup, Boyd, Carter, and a part of Lawrence counties," constructed by Mr. A. R. Crandall, and published in Volume II., Kentucky Geological Survey Reports, N. S. Shaler, Director, 1875. It is subject to modification here and there, in certain parts of the field, especially in the direction of Pine Mountain, but as a type with which comparisons may be made, and upon which other sections may be correlated, it is applicable to the whole field.



*Northeastern District.* Correlating the coals of this section with those of Ohio and Pennsylvania, as described in Vol-

\* Scale, 150 feet to the inch.

ume V. (Economic Geology) of Prof. Orton's Ohio Reports, the following synonyms will probably hold good :

No. 1 is regarded as the equivalent of the Jackson Shaft ; the Brier Hill ; the Block coal of Mahoning Valley, of Ohio ; the Sharon coal of Pennsylvania. It is No. 1 of Orton's column.

No. 3, the Peach Orchard and the Turkey Lick coal of this District, is probably the equivalent of No. 3 of Ohio ; the Lower Mercer of Pennsylvania.

No. 4, known here as the Hunnewell cannel and as the Chinn's Branch cannel, is probably the equivalent of the Bedford cannel, Orton's No. 4, of Ohio ; the Upper Mercer, of Pennsylvania.

No. 5 is probably the equivalent of the Conway coal, Orton's No. 6, of Ohio ; the probable equivalent of the Brookville, of Pennsylvania.

No. 6 is the equivalent of the Lower New Lexington, the New Castle, Orton's No. 9, of Ohio ; the Lower Kittanning, of Pennsylvania.

No. 7, known here as the Coalton and as the Ashland, is the Sheridan, the Nelsonville, the "Great Vein" of Hocking Valley, the Coshocton coal, Orton's No. 10, of Ohio ; the Middle Kittanning, of Pennsylvania.

No. 8 is probably the equivalent of the Steubenville Shaft, the Hatcher coal, Orton's No. 11, of Ohio ; the Lower Freeport (Upper Kittanning), of Pennsylvania.

No. 9 is regarded as the equivalent of the Cambridge, the Big Vein of Salineville, the Bayley's Run and Norris coal of Hocking Valley, Orton's No. 12, of Ohio ; the Upper Freeport, of Pennsylvania. According to the numbering of Dr. Newberry, this would be No. 7 of Ohio. The Pittsburgh seam occupies the position of No. 8 of Newberry's section.



Capt. George Gibbs, Superintendent of the Mining Department, etc., of the Eastern Kentucky Railway Company, has kindly prepared the following notes on the coals of this District for this Report:

**Remarks on the Coal-Fields of Northeastern Kentucky.**

BY GEORGE GIBBS, ESQ.

"The Carboniferous measures of the Appalachian Field cover this territory. The workable veins lie in basins of greater or less extent, separated by barren regions caused by uplifts of the measures. Explorations have not as yet developed the territory to its extent, but it is unquestionably a good field, and must prove of much value in the future, when transportation facilities are secured.

"Eleven seams of coal are found; but those numbered 2, 3, 4, 5 and 7 in the reports of the Kentucky Geological Survey are the ones likely to prove of greatest value.

"In the region covered by Greenup, Boyd and Carter counties Coal No. 7 (the "Coalton coal") is the principal vein. It is from 3 to 5 feet in thickness, commencing in the hills south of Ashland and running southwest, including the waters of East Fork, Strait Creek, Davy's Run and Dry Fork. It has been extensively mined by the Ashland Coal and Iron Railway Company at Coalton, Rush and Kilgore's; the Norton Iron Works Company, on the Star Furnace property; the Lexington and Carter County Mining Company, on Stinson and Williams Creeks; by the Mary Coal Company and the Strait Creek Coal Company, on Strait Creek and Davy's Run; the Eastern Kentucky Railway Company and the Dry Fork Coal Company, in the vicinity of Willard, on the waters of Dry Fork. The main part of the unworked territory of this seam lies northeast from Willard. Southeast of Willard the measures rise rapidly and the coals disappear.

"Coal No. 3\* is also worked at several points in this basin, but has not the quantity or value of No. 7.

"Coal No. 4† is usually cannel, and is being mined at Hun-

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\* Known as the "Elkhorn" seam in Pike, Floyd and adjoining counties.—C. J. N.

† Generally known as the "Hunnewell cannel."—C. J. N.

newell and on Stinson Creek. It has been opened on Hilton Branch, south of Willard, but not worked to any extent.

"The upheaval south of Willard throws up the conglomerate measures along the upper waters of Little Sandy. Those measures extend across nearly to the Big Sandy Valley, in which the coals again appear, No. 2 showing in the vicinity of Paintsville. That coal underlies a large territory south and east of Paintsville (Johnson county), and is very fine in quality and quantity.

"Coal No. 3, worked at Peach Orchard and extending over a large territory south of there, is of value.

"Cannel coal, both No. 2, locally so, and No. 4, have fine exposures, and are of good quality in the same direction.

"On the waters of Daniel's Creek (Johnson county) and Rockcastle (Martin county) No. 5 shows as a fine vein, 5 to 6 feet in thickness.

"Passing south, the valleys of the upper waters of the Big Sandy show fine coking coal, only developed to a small extent, but promising a large field.

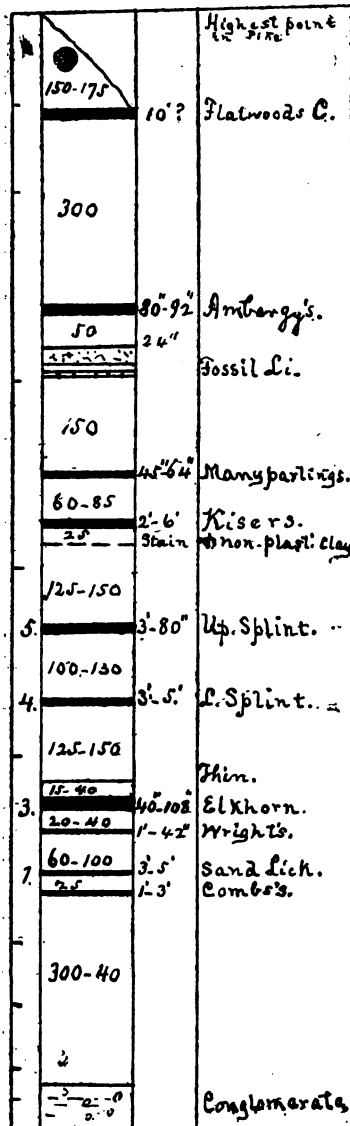
"Morgan and Magoffin counties, on the waters of Licking river, contain cannel coal which in some localities will prove valuable. The bituminous coal of that section will probably prove of little value, except for local use."

The object at present being to furnish data, in a convenient form, for the use of prospectors, rather than to discuss the quality of the coals, analyses and particular descriptions of the several seams are omitted. Such information, so far as regards the general character of the beds, may be found in the Survey reports or in the private reports from which the data for the compilation of the sections here presented were obtained.

*The Elkhorn District.*—This District includes Floyd, Knott, Pike and Letcher counties. No commercial mines are in operation within its limits at present, but, as stated in the chapter entitled "New and Other Mines," operations on a large scale are projected for the near future. It is confidently expected that, within eighteen months or two years (possibly sooner), this District will be one of the most important producers—in some respects the most important coke producer—in the State. Its development is delayed by the fact that a railroad must be built.

before any considerable work in the way of opening the mines can be undertaken. Arrangements are now under way looking to that end.

The accompanying General Section,\* condensed from the re-



Elk Horn District;

port of Mr. A. R. Crandall, on the Pound Gap region, will serve as a guide to the coals of the District. Mr. Crandall gives the following "Provisional General Section," to show "the vertical distribution of workable beds of coal in the Pound Gap region:"

1. Top of highest hills in Pike county.
2. Covered slope, 150 to 175 feet.
3. Flatwoods coal. Reported as a thick bed.
4. Mostly coarse massive sandrock, 300 feet more or less.
5. Amberg's 80-inch coal. Sycamore creek 92-inch coal. Highest workable seam in Knott county.
6. Shale and sandstone, 50 feet.
7. Thin coal. (Indicated as 24 inches thick in section taken on Amberg branch of Carr's Fork, in Knott county.—C. J. N.)
8. Sandrock and shale, 25 to 40 feet. Highest rocks in Letcher county north of Pine Mountain.
9. Fossil and bastard limestone horizon. (Shale, 20 feet.)
10. Coarse sandrock, with shale divisions, forming benches, 150 feet.
11. Coal with many partings.
12. Mostly coarse massive sandrock, 60 to 85 feet.
13. Kiser's 6-foot coal, in Letcher. (Bear Fork cannel, in Pike.)
14. Mostly sandrock, 150 to 175 feet.
15. Upper Splint coal, 36 to 80 inches.
16. Shale, shaly sandstone, and sandstone, 100 to 130 feet.
17. Lower Splint coal, 36 to 60 inches.
18. Mostly sandstone, 125 to 150 feet.
19. Thin coal so far as known.

\*Scale 300 feet to one inch.

20. Shales and sandstone, 15 to 40 feet.
21. Elkhorn coal, 40 to 108 inches.
22. Shales, mostly, 20 to 40 feet.
23. Wright's coal, 12 to 42 inches.
24. Shales, mostly, 50 to 75 feet.
25. Sand Lick coal (No. 1), 36 to 60 inches.
26. Sandstone and shale, 25 feet.
27. Combs's coal, 12 to 36 inches.
28. Shale and sandstone, the latter prominent in places, 300 to 400 feet. Several thin coals; irregular but probably locally workable.
29. Conglomerate formation, divided by shale beds of greater or less thickness into five to seven benches; including several thin coals, 2,000 feet.

The name "Elkhorn" has been given to this District in recognition of the coal—the great excellence of which for coking purposes is now pretty well known—upon the development of which the future of the region will largely depend.

*The Southeastern District.*—This District includes the counties of Clay, Bell, Laurel, Knox, Pulaski, Rockcastle, and Whitley, in which commercial mines are operated, and the counties of Harlan, Jackson, Leslie, Perry and Wayne.

The accompanying section of the measures in the region in-

No.	Genl. Sec.	Clay County	Breathitt County	Leslie County	Perry County
2	Iron Ore				
24-48	60			60	
40-70				40-70	
25-84				25-84	
80-200				80-200	
8-58		Bell 48"		8-58"	
40-130		12-5"		70-130	40
14-61		Bell 21"		14-61"	
50-75				65	55
1-41"		29"	41"	1-38"	40
45-50				50	
17-53		53"	3'	17-35"	
40-70		40-45			
9-52		9-40	24"	8-32"	52"
40		40			
25-60		35'	25-60		
6-61"		1-3'	6-61"	6-22"	59"
40-95		40-95	40-50		
4-19		1-17"	19"	4-1'	16"
40-80		40-80		40-45	55
2-50		8-34	9-45	7-50"	35-45
15-35		10-35	15-25	15-35	10-25
2-73		19-51	10-42	45-73	20-36
60-85		85-130	40-85	10-90	
4-39		6-16"	4-16"	8-39"	
45-70		20-65	45-70	35	
1-70"		1-70"	17-36"	18-59"	21"
30-125		Knox 45-125	30-65		
6-44		1-41"	6-18"	32"	21-44
55-60		55-60			
30-47		30-47			32"
35-90		45-90	30-35		
1-42		1-42"	2-30"		

Upper Ky. River Region.

gives no indication of possessing coking qualities.

cluded in the counties of Clay, Leslie, and Perry has been compiled from data given in Mr. J. M. Hodge's report on the geology of the upper Kentucky river. Mr. Hodge gives the following recapitulation of his observations concerning the coals:

"Sub and inter-conglomerate coals reach the surface only in southwestern Wolfe and, possibly, Clay counties. So far as found, they are without economic value. (The main sub-conglomerate, or Three Forks coal, is below the surface in the region described.)

"Coal 1 has a large area developed in Wolfe county and lower Breathitt, on the North Fork, ranging from two to three feet in thickness. It is the least variable of all the beds, is an excellent bituminous coal, with some splint, and promises, unlike its equivalent farther north, to become an important coking coal.

"In Clay county the coal is much used for local consumption on Goose creek, where it is two and a half to three feet thick, but it

"*Coal 1a* is a thin cannel in Wolfe county, without working value. Elsewhere it occurs only as a thin bituminous coal, except on Beech creek, Clay county, where there is about one foot of cannel overlaid by two and a half feet of bituminous coal.

"*Coal 2* is not found as a cannel, and carries but little splint coal. It reaches a thickness of over two and a half feet on Long's creek, where it is an exceptionally fine coal, and will probably become an important working bed along the Middle Fork, in Perry county, where it reaches a thickness of over three and a half feet.

"In Clay county its single thick opening on Left Fork, Goose creek, promises well for that vicinity only.

"*Coal 3*, the 'Elkhorn' coal, is found as a superior coking coal in a thick pocket in Wolfe county. It is found as a cannel coal in Breathitt county, but in thin seams only. An extensive field of coal, three and a half to four and a half feet thick, probably also suited for coking, has been well developed along the North Fork from Bloody creek to Stray branch. Another hardly less important field, with a thickness reaching up to five feet of coal, is found on the Middle Fork extending from below Hyden, Leslie county, nearly to the mouth of Beech Fork. These fields are somewhat interrupted by areas of thin coal, probably small. In Clay county the bed again carries a thin seam of cannel coal, and this can be profitably worked on Left Fork, Goose creek. Evidence is found pointing to the extension of this field as bituminous coal only, through from one fork of Goose creek to the other.

"*Coal 3a* is generally a thin bituminous coal, with occasional pockets of cannel, one of which has been considerably worked near the mouth of Quicksand creek, Breathitt county.

"*Coal 4*, the most important bed, is the 'lower splint' of previous reports, sometimes a cannel coal. In Leslie county, and parts of counties adjoining it, it is conspicuously marked by a persistent thin parting of non-plastic clay, on account of which it is made the base in grouping sections at an assumed elevation of 500 feet. Working seams are found in the southern part of Wolfe county, but they appear to be limited to pockets. Above the mouth of Troublesome creek, Breathitt county, frequent openings show an immense area of coal, varying from two and

a half to over seven feet in thickness, and containing pockets of cannel coal of good thickness and quality. Thick deposits are found along the North Fork nearly through to Perry county, and one is believed to extend from the North Fork across Middle Fork—on Ebersole branch and Guy's creek, and down to Squabble creek, where it yields the purest bituminous coal of the region. Another larger, and still more promising field—favorable in the more uniformly thick coal found—extends in Leslie county from Rockhouse creek, up the Middle Fork and Cutshin creek to the points at which the bed disappears below those streams, and nearly the full length of Greasy creek. Of the many openings made in it scarcely any give a thickness of coal of less than three feet. On the waters of South Fork the coal is generally thin, exceptional thick deposits lying near the heads of Big creek, Leslie county, and Left Fork, Goose creek, Clay county, which are not unlikely to prove of considerable extent.

“*Coal 4a* carries cannel coal over a greater area than any of the other beds, but where of workable thickness the cannel is probably still in pockets. It lies frequently so near Coal 4 that both beds are made more valuable thereby, and it appears that they are sometimes in contact. In lower Breathitt it has been developed as a cannel coal without the discovery of any thick deposit. Its openings of nearly three and four feet, on Grapevine creek and Ebersole branch, North Fork, alone indicate a considerable working field in that part of Perry county; the latter thickness includes eleven inches of cannel coal. Near the head of Middle Fork and on Beech Fork, Leslie county, it again becomes prominent, with over four feet of bituminous coal on the former stream, and thirty-eight inches cannel on the latter.

“*Coal 4b* has been found only in thin seams, though its previous discovery as a thick coal elsewhere leads to the expectation of finding similar deposits in this region.

“*Coal 5*, the ‘upper splint,’ is another important bed, containing cannel in Wolfe and Breathitt counties. Near the head of Frozen creek, Breathitt county, it is three to three and a half feet thick, part splint and semi-cannel coal, and probably over four feet thick across the hill in Magoffin county. About the mouth of Troublesome creek is an irregular field with coa-

from three and a half to five feet thick, including the Haddix coal with its three feet of fine cannel. Unusual difficulty in opening the bed has undoubtedly prevented finding much other valuable cannel coal in this vicinity. A five feet opening on Long's creek probably marks the south-western limit of the field. Along the base of Pine Mountain, Harlan county, it is three to four and a half feet thick, slickensides coal, as shown by exposures at the forks of Laurel Fork and of Greasy creek.

"*Coal 6* is frequently in part cannel coal, but as yet has been found with a workable seam of it only on the Middle Fork below Rush creek, Perry county. Scattering openings made in bituminous coal, three to five feet thick, show it to be of some importance; these are on Grapevine creek, Perry county; Beech Fork, Middle Fork, Leslie county; and Katy's creek, Clay county.

"*Coal 7* is of working thickness on the head of Frozen creek, Breathitt county, and over a considerable area about the mouth of Troublesome creek openings have discovered a field, with five feet maximum thickness, which may extend to the Perry county line. Thick coal is found also in Perry county on the North Fork above Rock Lick branch, and on Big creek; and in Clay county, probably on Bullskin creek.

"*Coal 8*, above the mouth of Troublesome creek, is an important cannel bed four feet thick, with about one foot cannel. Along the North Fork, in Perry county, openings indicate a constant thickness of three to five feet. In Leslie county, three feet on Wolfe and White Oak creeks gives some promise of a considerable field there.

"*Coal 9* has but few openings, of which the principal are: Markham branch, North Fork, Breathitt county, three feet; Fish-trap branch, North Fork, Perry county, four and a half feet, and Big creek, Leslie county, five feet.

"*Coal 10* has five feet of coal on Big creek, Perry county, and on Reuben and Oldhouse branches, Beech Fork, Leslie county. Probably an excellent working bed will be developed in Kentucky ridge, in Harlan and Bell counties, and in its northward spurs.

"*Coal 11* has seven feet of coal at the head of White Oak creek, Leslie county, but it has sufficient area for working only



on the south side of Greasy creek, where it is five feet thick on Laurel Fork, and three and a half feet on the head of Middle Fork.

"*Coal 12* has been found but has not been investigated."

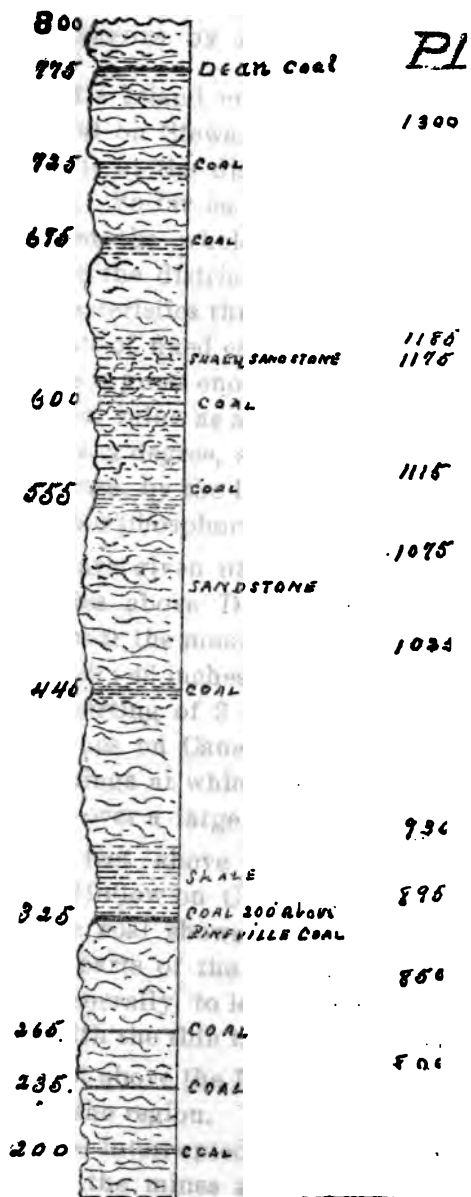
Plate III exhibits the vertical distribution of the coals in the Pineville region, Bell county, north of Pine Mountain. The Section was constructed by Prof. A. R. Crandall, to accompany a report (unpublished) made for the Pine Mountain Coal and Iron Company, 1891, and is published by permission of that company's successor, the Southern Land Improvement Company.

Following are extracts from Mr. Crandall's report, given by permission of Mr. Jno. G. Taylor, Treasurer of the Southern Land Improvement Company :

"The coal-beds of this region are distributed through about 1,200 feet of the coal measures above the conglomerate formation. Several beds of coal, including the Barner seam of the Yellow creek valley, would be found below the drainage and above the conglomerate. Whether any of these are thick enough to be of special interest in this connection is doubtful, from a general knowledge of this portion of the coal-bearing series, though it contains, also, the bed which locally becomes a cannel coal of note, that of the Muddy Branch of Clear creek.† . . . .

"The first workable coal, the 'Pineville seam,' at the base of the hills in the greater part of the region, is the only bed that has been thoroughly tested for special use. It proves, as indicated by analyses, and by its structure and appearance, an excellent fuel, both as coal and coke. In either form its special qualities are based on exceptional freedom from impurities. In the matter of thickness this bed falls below that of the ideal seam, increasing somewhat, relatively, the tonnage cost of mining—a fact which will be more than offset by the special adaptation of the whole product of the mines. . . . The thickness of this bed increases up the valley of Straight creek, showing an increase from 30 inches on Dorton Branch to 46

† Which is probably the equivalent of the "Birdeye coal," of Whitley county.



SECTION  
 NORTHWEST  
 CORNER OF  
 SECTION 36  
 T. 1 N. R. 10 E. S. 10  
 RANGE 10 E. T. 1 N.  
 RANGE 10 E. T. 1 N.

SECTION  
 NORTHWEST  
 CORNER OF  
 SECTION 36  
 T. 1 N. R. 10 E. S. 10  
 RANGE 10 E. T. 1 N.

*[The page contains faint, illegible markings and artifacts.]*

inches on Kettle Island creek, where it falls below drainage. Mining this coal on Stewart's branch and near the mouth of Straight creek is at the disadvantage of taking it at its minimum thickness. So far as examination, and analyses of samples taken from the whole thickness of the bed at points distributed over the district, may determine, this coal retains its special characteristics throughout. . . . Few coals have a higher per cent. of fixed carbon, and yet the per cent. of combustible matters is great enough to make it a free-burning coal, giving it a special value as a steam coal. This characteristic is made possible, to a degree, so far as I have noted, unsurpassed in the practical use, by the low percentage of ash and sulphur, and freedom from phosphorus and other destructive agents." \*

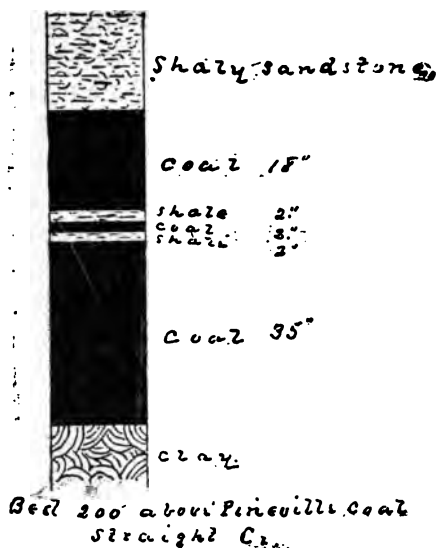
[Bed-sections are given of the coal, showing it to range, at different localities above Dorton branch, from 41 inches on Straight creek, near the mouth of Elliott's branch, to 39 inches, on Elliott's branch; 46 inches on Kettle Island creek; 43 inches, exclusive of a parting of 3 inches, on Left Fork of Straight creek; to 38 inches on Caney Fork of Left Fork of Straight creek. The openings at which these measurements were made "are distributed over a large area." ]

"Seventy-five feet above the Pineville coal, opposite the mouth of Cope Hollow on Caney Fork, the equivalent of the second Four-mile coal shows 46 inches, including three partings; but as the parts of the bed become too widely separated in this district, generally, to leave it more than a local value, it may be classed with the thin beds of the General Section."

"About 200 feet above the Pineville coal is found the second workable coal of the region. Its extension west from the Left Fork appears to be interrupted by the widening of its parting. As opened above the mines at the Forks of Straight creek, it shows as follows: †

\* The Pineville seam is the equivalent of the "Elkhorn" and "Jellico" beds, No. 3 of the Eastern Field.—C. J. N.

† The cuts exhibiting "bed-sections" of the coals are reproductions of illustrations prepared for his report by Mr. Crandall.



Moisture . . . . .	2.20
Volatile combustible matters . .	34.70
Fixed carbon . . . . .	58.86
Ash . . . . .	4.74

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100.00

Sulphur . . . . .	1.126
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"The analysis is from a sample representing both benches of the bed." [Other sections given show thicknesses varying from 37 to 49 inches.]



"The area of this bed is considerably less than that of the Pineville seam. But in a large region adjacent to the coking plant above the mouth of Left Fork, it may prove a very important adjunct to the bed below, as it is also a coking coal."

"The third workable coal is known as the Dean coal. It is a good coal, considerably limited in area as a workable bed by irregularity in thickness. . . . It is the principal bed above the drainage towards the head of the Left Fork. Having a northward dip on the upper Left Fork, it falls below the drainage near the head of that creek."

Following is the bed-section of the coal as seen at one exposure on Long Branch, Left Fork of Straight creek :

a. Coal . . . . .	12 inches.
b. Clay . . . . .	3 "
c. Coal . . . . .	8 "
d. Shale . . . . .	1 "
e. Coal . . . . .	23 "
f. Sandstone . . . . .	3 "
g. Clay and streaks of coal . . . . .	15 "
h. Clay . . . . .	—

Analyses of the coal are as follows:

	sandstone	RAMSOM SLUSHER'S COAL:	
	coal 6 1/2"	Moisture . . . . .	1.40
	clay 4"	Volatile combustible matters . . . . .	37.10
	coal 3 1/2"	Fixed carbon . . . . .	56.30
		Ash . . . . .	5.20
		Sulphur . . . . .	1.151
	clay 4"	<i>Epperson's Coal</i> , on Symmes' Fork,	
	coal 6"	yields as follows:	
	clay 3"	Moisture . . . . .	2.00
	coal 6"	Volatile combustible matters . . . . .	32.80
	clay shale 15"	Fixed carbon . . . . .	59.98
		Ash . . . . .	5.22
		Sulphur . . . . .	0.601
	sandstone		

#### DEAN COAL

at  
Ramsom Slusher's  
on left fork of Straight Cr.

"A characteristic feature of the Dean Coal is a parting of a few inches of non-plastic clay, which is found in this region in two openings only." [This clay may be seen at the horizon of this coal, near the incline of the Breckenridge and Pineville Syndicate, near West Pineville.—C. J. N.]

"Seventy to eighty feet above the Dean coal, a bed, known as the McGuire coal, has been opened at a few points. On the head of Stewart's Branch, at one point, the bed has been faced up to show 64 inches, as in the accompanying cut. . . . In the spur west of Stewart's branch this bed shows 55 inches, 19 inches of which, at the bottom, is a slaty cannel coal."

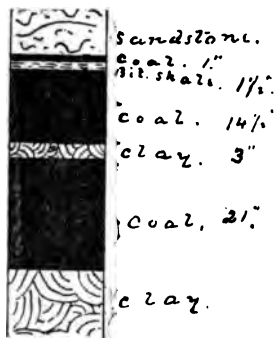
[Other sections are given, showing thicknesses of 37 and 42 inches, including clay partings. At the cannel mine of the Breckenridge and Pineville Syndicate, Limited, I obtained the following measurements of the bed:

a. Bituminous coal . . . . .	6 inches.
b. Shaly "mother coal" . . . . .	2 to 6 "
c. Bituminous coal . . . . .	34 "
d. Cannel . . . . .	18 "
Total . . . . .	64 "

The "mother coal," *b*, is usually from 2 to 3 inches thick. The bituminous, *c*, has a division—but not a "parting"—at 18 inches from the bottom.—C. J. N.]



“One hundred and seventy-five feet higher in the series another workable bed has been opened at a few points. It may be seen at the foot of a sandstone cliff at the head of Hos-



kins Branch of main Straight creek, 975 feet above the mouth of the branch. Illustrations of the bed-section are here given. This bed is also opened on the Left Fork of Straight creek, near Ransom Slusher's, 500 feet above the creek, having 41 inches of available coal.” . . .

Coal 250' above Dean Coal  
Straight Cr

The bed-section of the coal near Slusher's is as follows:

a. Coal . . . . .	18	inches.
b. Sandstone . . . . .	2	"
c. Coal . . . . .	13½	"
d. Clay . . . . .	¼	"
e. Coal . . . . .	4½	"
f. Bituminous shale. . . . .	3½	"
g. Coal . . . . .	6	"
h. Clay . . . . .	—	"

Following is an analysis of the coal. The “sample for analysis was taken from the whole bed:”

Moisture. . . . .	1.60
Volatile combustible matter . . . . .	37.80
Fixed carbon . . . . .	54.40
Ash . . . . .	6.20
	<hr/>
	100.00
	<hr/>
Sulphur. . . . .	0.360

Mountain Series.

1200'

40'

M. A.

P. A.

C. A.

Thin

100'

Thin

G. A.

Grb. Limestone

300'

L. 2g

Thin

0'

Diagram description: A geological cross-section showing a series of tilted rock layers. The layers are labeled from top to bottom: 'M. A.', 'P. A.', 'C. A.', 'Thin', '100'', 'Thin', 'G. A.', 'Grb. Limestone', '300'', 'L. 2g', and 'Thin'. A vertical scale on the left indicates elevations of 1200', 40', 100', 300', and 0'. The 'Grb. Limestone' layer is shown as a large, tilted block. The 'Thin' layers are indicated by thin lines. The 'L. 2g' layer is a thin layer at the bottom. The '0'' mark is at the base of the section.

Division of Southern Land Imp Co..



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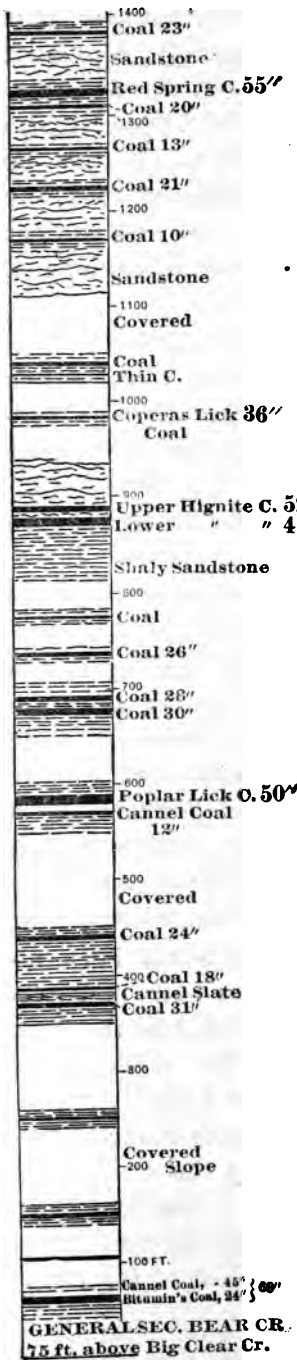
Plate IV. is a diagram given by Mr. Crandall to show the relations of the beds, on the north, to the Pine Mountain fault, and is published by permission of the Southern Land Improvement Company, through the courtesy of Mr. John G. Taylor, Treasurer.

The accompanying section of the Log Mountain region in Bell county, south of the Pine Mountain fault, from a special report of Prof. A. R. Crandall to the Log Mountain Coal, Coke and Timber Company, is published by permission of that company, through the courtesy of Mr. F. A. Hull, President. It applies to the Clear creek regions. An analysis of the cannell bench of the lowest coal shown is as follows, as given in the report in question :

Moisture . . . . .	1.00
Volatile combustible matters . . . . .	51.60
Fixed carbon . . . . .	40.40
Ash . . . . .	7.00
	<hr/>
	100.00
Sulphur . . . . .	<hr/> 0.739

The accompanying section of coals in Mingo Mountain, lying partly in Bell county, Ky., and partly in Claiborne county, Tenn., was made by Messrs. John and Robert L. Ralston, of the Mingo Mountain Coal and Coke Company, and was kindly furnished for this Report by Mr. John Ralston, President of the company.

The relations of the coals of this section to those of the Log Mountain Section are as yet unknown by the present



writer, and Mr. Ralston himself has not been able to aid in determining the question. It is not improbable, however, that the two coals 66 and 42 inches thick, respectively, separated

69"		
48"	30'	
46"	40	
54"	30	'Fine.'
	160	
42"		
66"	25	Tested for Coke.
	250	
24"		
	45'	
72"		Ralston Seam.

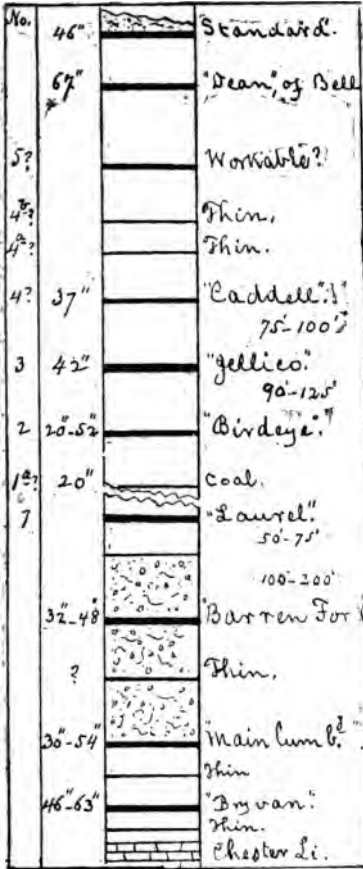
by an interval of 25 feet, are the equivalents of the Lower and Upper Hignite seams of Log Mountain. If this be correct, it would suggest that the "Ralston seam," the one now worked by the company, is the equivalent of the "Poplar Lick."

The accompanying condensed Section for Whitley and Pulaski counties has been compiled from the sections presented in Prof. A. R. Crandall's report on those counties. The three sandstones shown below the Laurel coal are the "Conglomerates" of the "Rockcastle Series." Following are extracts from the report in question:

"The thin coal near the top of the Chester group is interesting as occurring at a coal level of some economic importance in Jackson county—the Jackson county cannel horizon. It is shown in the Happy Hollow region under the first prominent sandstone edge." The Bryvan coal "is the most

Mingo Mountain," prominent bed in the South Fork region. It has been opened at a number of places both in Whitley and in Pulaski; rising to the westard, it should be the most widely distributed bed in Wayne county." The thickness of the coal "varies from 46 to 63 inches in one body." "Preliminary tests of the coking quality of the Worley branch (Bryvan) coal resulted favorably, as will be seen by the analysis of the coke, which is described by Dr. Peter as a firm and compact coke. The favorable result of these tests is the more interesting, as this bed is supposed to be the equivalent of the Poca-

hontas coal of Virginia." The analysis of the coke is given as follows:



1 Inch = 300 ft.  
Wythe & Pulaski.

Moisture . . . . .	2.10
Fixed carbon . . . . .	90.46
Ash . . . . .	7.44
Sulphur . . . . .	0.665

"The Happy Hollow coal, on the Cincinnati Southern Railway, 50 to 60 feet above the top of the Chester group, has 39 inches of good marketable coal. . . . In the Cumberland and Rockcastle river region this seam is represented by the 'Lower Coal' of the 'Cumberland Coal' region. . . . The lower coal is about 60 feet above the Chester shales, as noted at the Edwards mines, three fourths of a mile below the mouth of the Rockcastle river."

"The next workable coal in the Series is also found in both the South Fork and the Rockcastle region. It is from 70 to 90 feet above the seam just described. This bed is opened on the Worley and Stover branches of the South Fork, 44 and 37 inches respectively, as

measured by Mr. Thruston. . . . In the Cumberland and Rockcastle region this bed is the main coal. . . . Rayburn's 'Slip-up mine,' on the great bend of the Cumberland river, is the only place visited where mining is now carried on in this district at this coal horizon." [Bed-sections are given which show thicknesses of the coal ranging from 40 to 54 inches.]

"The third workable coal seam of this group is the Barren Fork, Flat Rock, Greenwood, Beaver creek seam, about 200 feet higher up in the formation." [Bed-sections are given showing thicknesses of 32 to 36 inches of solid coal, and of 38 to 46 inches of coal exclusive of partings.] "This bed would doubt-

less be found at its proper outcrop level in the South Fork valley, in Whitley county, 200 feet or more below the grade of the Cincinnati Southern Railroad. . . . Above this coal level follows a conglomerate sand-rock from 100 to 200 feet in thickness. This is removed in part or entirely over a considerable part of this field. It is most prominent towards the Tennessee line, forming the rock tables southward from Flat Rock station."

In regard to the "Laurel" coal, which is No. 1 of the Eastern Field, and is shown on the section just given, Mr. Crandall says: "In Whitley county it has not been opened in such relation to the top of the conglomerate measures as to give it a definite relation to that formation. In Laurel it is from 50 to 75 feet above the conglomerate." . . . "Of the coals in the measures above the conglomerate division, the bed known as the Jellico seam is the most important. . . . In the series above the Rockcastle group this coal is the third workable bed. Counting all the seams which may have local value, the Jellico seam would be the fourth or fifth in the series. . . . In its relation to the topography of the hill region to which it is here limited, it ranges from 200 to 400 feet above the main water-courses. In bed-section it has a thickness varying from 30 inches to 62, generally separated into two benches by a thin clay parting, which is reduced in its northward extension to a mere trace, or replaced by a thin parting near the base of the bed. [This clay "parting" is sometimes 22 feet thick.—C. J. N.] In this region this bed is exceptionally persistent in its structural characteristics, as it is also in its composition, being unusually free from excess of ash and sulphur throughout."

"Below the Jellico seam, 100 to 125 feet, in a portion of the Whitley region, is a bed which will find a ready demand from its free burning qualities. It is known as the Birdseye coal, from the peculiar pitted fracture which it exhibits in unusual perfection." [The thickness of the coal ranges from 20 to 52 or more inches.]

"From 75 to 100 feet above the Jellico seam a bed of considerable importance has been noted at a few points. The Caddell seam, in the ridge between the forks of Wolf creek, which is

at this level, shows a thickness of 37 inches. It approaches a cannel coal in composition, being a free-burning coal."

The coal indicated in the section at a level about 200 feet above the Caddell seam, "though not proven to be a workable bed in thickness, is sufficiently prominent to lead to the expectation that at some points it will be so found. . . . The next coal above, though too high in the hills to be of immediate value, is interesting as representing the Dean coal, of Bell county, in its southward extension into Whitley. It has been opened at a number of places at a vertical distance above the Jellico coal of 450 to 475 feet." [Bed sections are given showing thicknesses of 67 inches and 54 inches, including a parting of 7 and 4 inches, respectively. In some places the bed is so much divided by shale partings that it is rendered nearly valueless at those points.]

Prof. Crandall places the cannel coal worked at the Standard mines, a few miles south from Jellico, and known in this region as the "Standard cannel," at a level "something more than 500 feet above the Jellico coal." He says: "There are still coal seams above this bed to the tops of the highest hills, but little is yet known of them here. They are important as representatives of the beds of adjoining fields, chiefly."

In the Southeastern District nearly all the product is derived from two beds, No. 1 (the Laurel coal) and No. 3 (the Jellico and Pineville seams). Other coals worked are No. 3a(?); No. 1a(?) or No. 2; an inter conglomerate (at Barren Fork and Greenwood); a sub-conglomerate (at Alpine—the "Happy Hollow"); and the McGuire cannel.

## XI.

## INSPECTION NOTICES SERVED.

During the inspection year ending October 1st, in addition to verbal directions given, sixty written Inspection Notices were served. As showing, in part, "the proceedings" of the Inspector, they are given below.

In regard to them, the following extracts from the Report for 1891 are applicable :

"These Notices do not, of course, indicate the usual, or even the average, condition of a mine, but only its state at the time of inspection. A mine usually in a fair condition may be found defective, either in whole or in part, at the time of inspection, and shortly thereafter be placed in excellent shape; or one in good condition, on the day of inspection, may soon thereafter become the reverse; or a mine found defective may be placed in such condition as the Inspector's Notice indicates to be necessary, and again become defective before the Inspector can visit it again. . . . It may be well to state that the expressions 'no ventilation' and 'no air' do not always indicate the actual impossibility of working, for a limited time, in the place referred to. The atmosphere of the place may be sufficiently modified by diffusion to enable the miner to endure to work there for a time . . . but it will be at the expense of his health. A place 'not ventilated,' or which has 'no air,' is one which the ventilating current does not reach to freshen the vitiated atmosphere and *carry away* the mephitic exhalations; and the measure of the evil depends, as a rule, upon the remoteness of the place from the flowing air.

"When Bank Committees, to represent the miners as a body, are recognized by the Operator, they are also recognized by the

Inspector, and, upon request, are provided with copies of inspection reports."

Following are the notices served during the inspection year :

### THE NOTICE

No. 268.

McHENRY MINE.

No. 268.

November 27th, 1891.

W. G. Duncan, Esq.,

President McHenry Coal Company,

McHenry, Ky.

DEAR SIR: You are respectfully notified that on November 16; 17 and 18, 1891, the dates of inspection, you were working your mine, the McHenry, in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

### SPECIFICATIONS.

Memoranda :

Persons in North-side workings . . . . .	120
"    " Seventh South Entry workings . . . . .	19

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Order of Ventilation :

*For the North Side:* Intake is at the mouth of the 3d North Entry, and from Duncan's shaft, the two currents uniting in the "Short-cut" from the 3d North to the 4th North Entry ; passing thence to the workings on the 4th North and succeeding entries. Before its union with the current from the mouth of the 3d North Entry, the current from Duncan's shaft is expected to ventilate the 2d North and upper part of the 3d North, giving air to 20 persons. The full current is expected to travel through the rooms on the 4th North ; thence down the 4th North air-course to the rooms on the 5th North, by a break-through in the face of room 13, thence through the rooms on the 5th North ; thence into the 5th North air-course and down through rooms thereon ; thence to room 7 on the 6th North, and up through the rooms on that entry ; thence into the 6th North



air-course and down through five rooms thereon; thence into room 6 on the 7th North, and up through the rooms on that entry; thence to the main entry by way of the 7th North air-course, and up to the air-course of the 7th South Entry.

*For the South Side :*

With the exception of three rooms (Nos. 1a, 1b and 1c), which get their air direct from the South side split which travels up the Main air-course, the rooms on the 7th South Entry are expected to be aired by the current which comes from the North side workings and enters the 7th South air-course. See remark concerning this under "7th South Entry."

The statements made herein refer to the dates of inspection, and are framed as if made then.

*North Side—120 persons.*

November 16.—The volume of air entering No. 9 room of the 4th North Entry from the Short-cut varies, as shown by the following readings :

	By W. G. D.'s Instrument.	By C. J. N.'s	Average of the two.
Maximum . . . . .	10,036 feet.	10,333 feet.	10,184 feet.
Minimum . . . . .	9,739 "	8,228 "	8,934 "
Average of three readings . .	9,910 "	9,379 "	9,645 "

It is fair to conclude that the average volume passing varies from 8,984 to 10,184. Using the higher figure we find the volume to be nearly 2,000 feet short of the required amount. Since 26 persons, on the 2d and 3d North entries and air-course are to be supplied by the current (3,638 feet) coming from Duncan's shaft, we have only, say, 7,584 feet available for the 94 persons on the 4th North and succeeding entries, when the current starts into room No. 9 of the 4th North; too little by about 1,816 feet.

(November 16th.) *2d North Entry—6 persons.*

The volume of air coming for this entry, from Duncan's shaft, as measured in break-through between O'Bryan's and Espey's rooms, amounts to 3,638 feet.

Espey's room being open, the current nearly all goes out to the entry, leaving the Penman No. 1 and Penman No. 2 rooms, and the work above, without adequate ventilation at the faces.

The faces of the Penman rooms are also too far ahead of a break-through. I note that a second break-through between the Espey and Penman No. 1 rooms is nearly completed, and that Mr. R. Duncan states his intention to curtain the Espey and Penman No. 1 rooms as soon as it is done, so as to bring the air through properly.

It is proper to say that the work on this entry has been greatly improved since the last inspection. See "Note A."

(Nov. 17.) In consequence of the rooms noted above being open, the head of this entry, now known as Joe Beverage's room, is also without ventilation. Carrollton's room, following the 2d North, is also, for the same reason, and the additional one, that the air is not turned into it, without adequate ventilation. I note the fact that Carrollton's room is to break into No. 3 room of the 3d North Entry; that the air is then to be turned into it, and thence through the rooms on the 3d North; that it lacks about 15 feet of being through, and that the connection is expected to be completed within two weeks. See Note A.

*3d North Entry*—15 persons in rooms; 1 on entry; 4 in air-course. Total, 20:

This is expected to be aired from the 2d North, as indicated above. The open break-throughs into the air-course opposite No. 14 and No. 16 rooms should be closed, so as to send the air through the break-through at the head of the entry. Perry Gray's room, on the air-course, should be given ventilation.

In the mouth of Kelly's entry (from the air-course) a volume of 2,784 feet of air was passing—showing sufficient air for this (as well as 2d North) entry, if sent through the working places properly.

*Note A.*

When the changes now in progress and contemplated, and promised to be completed as fast as possible—all to be done within two weeks—are made, the work on the 2d and 3d North entries will be well ventilated. Said changes are: Completion of upper break-throughs between the Espey and Penman No. 1, and between Penman No. 1 and No. 2 rooms; the curtaining

of Espey and Penman No. 1 rooms, and supplial of air to face of "Joe Beverage" room; the completion of the connection between Carrollton's room and No. 3 room on the 3d North, and sending the air through it; the closing of all break-throughs save the last one between the 3d North Entry and its air-course, and the supplial of a good curtain on the 3d North.

*November 17. 4th North Entry—26 persons:*

At the break-through into No. 9 room from the Short-cut: There should be a volume of 12,000 feet of air traveling here. Measurements showed, as an average of 3 readings, 9,802 feet (using W. G. D.'s instrument), a *little* below yesterday's readings. The measurements were as follows:

Maximum . . . . .	10,117 feet.
Minimum . . . . .	9,308 "
Average of three . . . . .	9,802 "

Deducting 2,600 feet from foregoing on account of the persons in 2d and 3d North Entries, we have available for the 94 persons in this and succeeding North Entries:

Maximum . . . . .	7,517 feet of air.
Minimum . . . . .	6,708 " "
Average of three . . . . .	7,202 " "

Using the higher figures, the volume of available air is 1,883 feet short.

Between rooms 14 and 15 a volume of 2,282 feet of air was found (2,518 feet being found between rooms 12 and 13).

The air passes regularly through the rooms, and in sufficient quantity—except as to nearness to faces in two instances—up to and including No. 23; it then goes to the entry, leaving the upper rooms, up to and including No. 31, insufficiently ventilated. I note that the rooms up to and including No. 26 are to be curtained, and a curtain placed on the entry between No. 26 and No. 27 rooms—which will remedy the matter.

A second break-through is needed between No. 15 and No. 16 rooms, and the lower one closed. I note that "gripping" for the second one is in progress.

A second break-through into No. 25 room is needed, and the rear ones closed, so as to bring the air to the face.

*Note B.*

Work on this entry has been greatly improved since the last

inspection was made, and it will be in good condition as soon as the additional changes indicated are made.

Since, however, all the air for the North side is expected to pass through the break-through into the 4th North air-course, just back of room No. 30, while there is only 2,243 feet (out of an original volume of say 10,117 feet) passing there, and only 5,259 feet passing down the air-course back of said break-through, it seems there are still considerable losses that have not been taken up. In order for this entry to have its proper share of air, there should be not less than 5,200 feet passing through the break-through in question.

*5th North Entry*—In rooms, 10 persons; in entry, 2. Total persons, 12.

The air for this entry, indeed, for the entire North side—except a split for 3 persons—is expected to pass through a break-through in the face of No. 13 room. But, on account of the opening being too small, only from 1,654 to 2,415 feet—say an average of 2,035 feet—go through. There should be not less than 11,700 feet—the remaining 300 feet (of the 12,000 feet required) being required for rooms 10, 11 and 12 below.

In the 4th North air-course just ahead of the opening into said No. 13 room I could find only 5,340 feet of air. There should be not less than 12,000 feet, since the full current for the bank is expected to pass there.

Since rooms No. 12 and No 13 on this entry (5th North) are open to the entry the air goes directly to the entry and the rooms above No. 13, No. 14 to No. 21 inclusive, are without adequate ventilation, although all necessary break-throughs have been made. The mouths of No. 13 and No. 14 should be closed and the rear break-throughs between No. 14 and No. 15 stopped, so as to make the current pass through the upper break-throughs.

The current is nearly all lost, even on the entry, by the time No. 19 room is reached, the best measurement that could be obtained between rooms 19 and 20 showing only 951 feet, out of the original volume of say 10,117 feet.

The first break-through into the air-course beyond No. 21 room should be closed, so as to send the air through last break-through, which has just been made.

There should be not less than 12,000 feet of air passing

through the break-through beyond room No. 19, that being the present path for the full current for the North side. For this entry to have its proper share, and for the 5th North Air-course (with 18 persons) to get its requisite proportion, there should be not less than 8,200 cubic feet of air passing through the break-through beyond room 19 (or the upper one when the latter is closed), but, as indicated, less than 1,000 feet could be found.

*5th. North Air-course—18 persons.*

As indicated above, there is not sufficient air entering this air-course for the work on it in connection with that on preceding entries, etc.

Break-throughs are needed between rooms 14 and 15, and 13 and 14, and 11 and 12, there being none at all; and a curtain should be placed so as to send the air into No. 15, and the mouths of the rooms below curtained so as to keep the ventilating current in the rooms. It now goes into room 13 and out of No. 12, and down the air course to No. 4, in No. 4, and then out of No. 3, No. 2 and No. 1.

Only 3,267 feet of air are passing through the break-throughs from No. 13 to No. 12 room. For the work on this air-course and preceding entries alone there should be not less than 8,200 feet passing.

The faces of No. 14 and No. 15 rooms are about 96 feet beyond the air. No. 13 room is about far enough up for another break-through; also No. 7. There should also be another one between No. 1 and No. 2—the faces being 60 feet beyond the present break-throughs—and the two present ones closed.

Below all the rooms, in the air-course, a volume of 7,082 feet of air was measured. Since the full current for the North side is expected to pass here, there should be not less than 12,000 feet passing.

*November 18th. 6th North Entry—15 persons in rooms, 1 on entry—16; 5 persons in rooms on air-course, 1 on air-course—6. Total, 22.*

The air enters through a break-through in the face of room No. 7. A volume of 10,376 feet was found (the average of 3 readings)—a gain of 3,294 feet over the amount found farther up on the 5th North air-course yesterday. The volume found

is not quite enough ; there should be not less than 10,400 feet passing—since this is the passage for all of the air for the preceding entries, and the 22 persons on this entry and its air-course. In fact, since this is the place for the full current for the North side to pass, there should be 12,000 feet passing here.

The current travels satisfactorily up to and into No. 9 room, but there goes, nearly all, out to the entry, the mouth of No. 9 being open. Only 858 feet go into No. 10 room. By the time No. 13 room is reached practically all the current has gone to the entry, hence it is to be said that the rooms on up from No. 11 are not adequately ventilated.

The face of No. 15 room is 66 feet beyond a break-through. (See Section 11.)

Room 16 is nearly far enough up (54 feet) for another break-through.

In the entry beyond No. 17 room a volume of only 3,840 feet of air is found. Not less than 10,400 feet should be passing for this entry and its air-course to have its proper share, and, since this is the course for the full current, there should really be not less than 12,000 feet passing.

There is no break-through between rooms 17 and 18, but I note that one is being made. But until provision is made for confining the current so that it will travel through the rooms, the break-throughs only serve to render the air less unwholesome (by facilitating diffusion) than it would be without them ; they do not afford "*good ventilation*."

Another break-through is needed from the entry into its air-course, and the present one stopped. (I note that a second one is about to be made.)

*6th North Air-Course*—5 persons in rooms ; 1 on the air-course.

Total, 6.

As stated above, not less than 10,400 feet of air should be passing into this air-course on account of the work here and in preceding entries ; while, since this is the path for the full current for the North side, not less than 12,000 feet should in fact be passing. Only 3,102 feet were found back of the two closed break-throughs that are behind the present open one.

A curtain between rooms 4 and 5 throws most of the air

(2,763 feet) into No. 5; but as none of the following rooms are curtained it constantly leaks back to the air-course. The 5th room is about far enough up for another break-through.

*7th North Entry*—14 persons in rooms; 1 person in entry; 1 in air-course. Total, 16.

The air is expected to enter through an opening in the face of No. 6 room. For this entry and its air-course to have their proper share, there should be not less than 12,000 feet entering, *i. e.*, the full current for the North side. Instead, only 4,779 feet were passing—7,221 too little.

What air does enter does not travel up through the rooms, but practically all goes directly to the entry from No. 8 room, which, though ready for one, has not yet been curtained. Hence, all rooms above No. 8 are inadequately ventilated both because the volume of air coming to the entry is insufficient to be wholesome, and because provision is not made for sending the current through the rooms.

Additional break-throughs are needed between rooms 10 and 11, 11 and 12, and 12 and 13, and one between 17 and 18. (I note that they are started.)

The break-through into the air-course just beyond room No. 20 should be closed, so as to send the air through the upper one. In the entry just back of the rear one a volume of 3,878 feet of air was found. There should be not less than 12,000 feet passing—this being the proper path for the full current.

#### *Main Entry.*

Just beyond the 3d South Entry, a volume of 7,799 feet of air was measured. This is *warm*, and is probably already too highly charged with carbonic acid gas to be wholesome.

#### *Mouth of Brattice leading up Main.*

This brattice extends from mouth of the 7th North air-course, and is intended to direct the air past the mouth of the 7th South, so that it will enter the 7th South air-course. It serves the purpose well.

At the Main entry end of the brattice a volume of 13,179 feet of air was passing—sufficient for the North side, if all traveled there. But a large part undoubtedly comes by leakage from

the Main. ~~As~~ already shown, the full current that starts in on the North side does ~~not~~ travel all the workings where needed. The fact is not overlooked ~~that~~ this will be remedied when the improvements in progress and ~~contemplated~~, are completed; but it is necessary to state conditions as I ~~had~~ them. Since the arrangement is to ventilate the North side with a single identical current, the full current should be found at all points that lie in the regular path for it; but, as shown, this can not now be done.

*7th South Entry*—14 persons in rooms; 1 in the air-course; 1 in the entry. Total, 16.

This entry is now, with the exception of 3 rooms, intended to be aired by the current coming from the North side, which would necessitate the volume of air entering the 7th South air-course to equal 13,300 feet, in order that the air supplied these workings may be wholesome. The best measurement, however, showed only 11,083 feet.

A curtain just back of No. 12 room throws the current sufficiently well into it and through No. 11, No. 10 and No. 9. (The upper break-throughs between the rooms, however, are too small.) But since there is no break-through between rooms 9 and 8, and the current goes to the entry from No. 9, the rooms back of No. 9 to and including No. 1 are not properly ventilated. The break-through should be made, and the air properly conducted through the rooms.

There are two open break-throughs between the entry and air-course beyond the one near No. 12 room. All should be closed except the top one, so that the air may be carried to the head of the entry, and the work beyond No. 12 room ventilated.

It is clear from the fact that fire-damp has manifested itself in No. 14 room, and from the condition of the roof in the upper part of the entry, that the ventilation of this entry should be carefully watched, and no chance given for an accumulation of fire-damp. The current should be made to sweep the working places thoroughly.

The roof in No. 12 and No. 14 needs careful attention; also in the entry along that stretch.

The three rooms off of No. 1, namely, 1a, 1b and 1c, are well aired directly from the main air-course.



It seems to me that it would be as feasible to ventilate the workings on this entire entry from the main air-course as from the North side, and that it would be better to do so, if the South side air is taken in as suggested in Notice No. 259.

The timbering near the bull-wheel on the 4th North and the projecting rock there need attention. The same is true of the timbering towards the mouth of the 5th North.

#### SUMMARY.

The bank generally has been much improved since Notice No. 259 was served, but yet needs considerable work to bring it into proper condition. Thus :

The 2d and 3d North Entries have been improved, but the improvements are not completed.

The 4th North Entry has been improved up to room 24, but beyond that the improvements are not completed.

The 5th North has been improved to room 14, but beyond that the ventilation is still inadequate, though the necessary break-throughs have been made.

The 5th North air-course has been improved somewhat, but not much.

The 6th North shows great improvement as to the amount of air started in, but the improvements necessary to send the air through the rooms are not completed.

The 6th North air-course shows some improvement.

The 7th North shows some improvement as far as room No. 9, but the necessary improvements for the work beyond are not completed.

The 7th South shows much improvement, but the necessary improvements are not completed.

In view of the effort that has been made and the work in progress, the time wherein to make the improvements required by Notice 259 and not yet finished, which expired November 11th, is extended for 30 days from that date (to December 12); new improvements required by this Notice are, of course, to be made within the 60 days usually allowed. It is earnestly hoped that prompt and careful attention will be paid to this.

A copy of this Notice will be furnished to your Bank Committee.

No. 269.

## NICKEL PLATE MINE.

February 6th, 1892.

J. M. Thompson, Esq.,

Genl. Man. Nickel Plate Coal Co.,

East Bernstadt, Ky.

DEAR SIR: You are respectfully notified that on January 30, 1892, you were working your mine near East Bernstadt, in violation of Section 11, of the Mining Law, a copy of which has been furnished you.

The statements herein are framed as if made upon the day of inspection.

*Specifications.*

1.—You are depending chiefly on natural means for ventilation. I note the fact that a pump is located at a shaft in the "Old Main" entry, the exhaust steam of which might, under favorable conditions, be regarded as an aid to ventilation. But the shaft is so wet that the steam is too quickly condensed to be of much service. Besides, the mouth of the "Old Main" being open as well as that of the slope entry, the air baffles.

2.—No provision is made for sending a ventilating current into and through the room, so as to air the faces in the manner prescribed by Section (11) eleven. This applies to all the rooms which are 60 feet or more long.

3.—The extension of the 1st Right, from the angle where the "Old Main" and the 1st Right meet, has no ventilation, and would have none even were there a good, *constant* current entering the slope, because there is no provision for sending a current into that part of the entry.

4.—The 5th Right entry, with twenty persons therein, has no ventilation.

5.—The Burton Entry, with 5 persons therein, has no ventilation. With 84 persons in bank, the number working when the inspection was made, there should not be less than 8,400 cubic feet of air flowing through the works. As you are aware, what air does come is constantly reversing, and it simply flows along the slope entry, part of the 1st Right and the Old Main. Arti-

ficial means, better than exhaust steam as at present obtained, are required to secure ventilation, and the current should be taken through all the working-places as prescribed by section 11.

The defective drainage of the bank, between the 1st and 5th Right, especially, is not overlooked; but the fact is noted that you are working to remedy that.

No. 270.

LITTON MINES.

February 6, 1892.

W. J. Litton, Esq.,

Sec'y and Gen'l Man'gr Litton Coal Co.,

East Bernstadt, Kentucky.

DEAR SIR: You are respectfully notified that on January 30, 1892, you were working Drift No. D in violation of section 11 of the Mining Law, a copy of which has been furnished you.

Much improvement is noted since the last inspection, in that a furnace has been built, and provisions made for sending air through rooms. But towards the head of the entry there are a number of rooms that are without ventilation, in consequence of the air-current going to the furnace through rooms, the mouths of which are open, back of them; and the head of the entry is in an especially bad condition with respect to air.

The fact is noted that you are now driving to make a connection with an entry from the "Black Diamond" mine, which is expected to give you better and easier ventilation; and that the connection is expected to be made soon.

Ample air was entering the drift (namely, 5,376 cubic feet) for the number of persons employed. The defect as noted lies in the distribution thereof.

No. 271.

PEACOCK MINES.

February 6, 1892.

C. D. Anderson, Esq.,

Superintendent Peacock Coal Co.,

Pittsburgh, Ky.

DEAR SIR: You are hereby respectfully notified that on January 26th and 28th, the dates of inspection, you were working

your mine, the Peacock, in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

*Specifications.*

1. With about 91 persons in bank sufficient air is not carried through the working portions so as to adequately ventilate the "working places." At the furnace a volume of 12,017 cubic feet was measured, but a considerable portion of this, as appears from following notes, reaches the furnace by leaks, without being of service where needed.

2. Omitting the 5 persons in the "Old Baker," and the 5 in the "New Patterson" entries—who seem to get sufficient air for the work there—there are 81 persons to be supplied by the current which is sent up the Swamp Entry. They are distributed among the entries as follows:

Glancey Entry and air-course . . . . .	5
Swamp Entry, in a room and driving entry . . . . .	2
New Baker. . . . .	54
New Warnack . . . . .	12
Old Warnack. . . . .	8
	<hr/>
	81
	<hr/>

A volume of 8,100 cubic feet, at least, is required to be sent up the Swamp Entry for those persons. But measurements taken on January 26th and 28th showed only from 5,236 to 5,765 cubic feet—the first measurement being taken on the "Swamp," just back of the "Old Baker," and the second on the "Swamp," just back of the "Old Bowling" Entry. It will be seen that, granting the larger current to continue without loss to the "New Baker," which it does not do, there is not enough air to meet the legal requirements for the persons on the first three entries mentioned in the list above—*i. e.*, the "Glancey," "Swamp" and "New Baker" entries; thus leaving the "Old" and "New Warnack" entries entirely unaccounted for.

You will please observe that I do not state that there is no air going to the "Warnack" entries; as will be noted farther on, there is a current traveling both of those entries, but it is

air that should already have been carried through the works of the preceding entries, and when the amount due those entries is charged against the total volume traveling, there is none left to the credit of the two "Warnacks." This question has been discussed in my annual Reports.

Briefly, therefore, there is not sufficient air sent up the Swamp Entry for the number of persons to be supplied therefrom.

3.—The Glancey Entry : This has been carried far enough for the air to be turned into it. It is not done now.

4.—The Swamp Entry : The face is 61 feet beyond the New Baker, and is that distance "beyond the air." Air should be carried up to the face before it is driven farther.

5.—The New Baker Entry : There is a break-through from the Swamp Entry into the first room on the right of this entry, but it is of little service with reference to sending the air through the right-hand rooms, because there is no door or curtain on the mouth of the New Baker, and the air-ways to the upper entries are on the left side of the New Baker—hence, nearly all the air directly enters the New Baker. Thus :

(A diagram was given here.)

It is to be said, therefore, that the right-hand rooms are not adequately ventilated.

The fact is, the work on this entry, on either side, is not satisfactorily ventilated. There are two air-ways leading from it: one—the first from the Swamp Entry end—going to the "Old Warnack," and one going to the "New Warnack." The first one, being open, takes most of the air. This was shown by a measurement taken at the "Old Warnack" end of it, where a volume of 3,171 cubic feet was found. There need be less than 1,000 feet going through it to the "Old Warnack."

Without going further into detail, it is to be said that the ventilation of the work on this entry needs improvement, both with respect to the quantity of air sent in and the distribution of it through the rooms.

6.—The New Warnack Entry : Very little air, comparatively, comes to this entry, and what does come is already charged with the foul emanations and powder fumes of the work on the

New Baker. Moreover, as has already been stated, the volume coming here is not to be credited to this entry, but belongs to the New Baker. The highest measurement showed only 1,667 cubic feet. As this is the course intended for the main volume of the air to travel, there should have been not less than 7,300 cubic feet traveling here.

Briefly, the ventilation of this entry is very defective, not only because what air does come is inadequate in quantity to afford "fresh air" to the work here, but because no provision is made for sending the current properly through the rooms.

7.—The Old Warnack Entry: Ample air comes for the small amount of work here, and it is fresh enough. In fact, as already indicated, while the volume of air coming up the Swamp Entry is not sufficient for the demands of the entries that must be supplied therefrom, this entry gets good air at the expense of the "New Baker."

8.—The New Patterson and Old Baker Entries get sufficient air for the work in progress there. I measured a volume of 1,834 cubic feet issuing from the Old Baker to Main.

Firing Shots. The practice, now allowed, of "firing at any time" is detrimental to the ventilation at any time, and it is especially so when the volume of air is no larger than that now traveling your bank, and when the bank is ventilated on the system you follow. If it is to be permitted to continue—against which I must protest—then the volume of air supplied must be very largely increased. As matters are now, it is distinctly prejudicial to the health of the miners.

It is due you to say that I found the bank much improved over its former condition.

No. 272.

VICTORIA MINE.

February 6th, 1892.

J. E. Baxter, Esq.,

Secretary Victoria Coal Company,

Pittsburgh, Ky.

DEAR SIR: You are respectfully notified that on January 28, 1892, the date of inspection, your mine, the Victoria, was found in fair condition except as noted below.

I congratulate you on the great improvement made since the last inspection.

I have but one complaint to make, which relates to the Fifth Right Entry, and upon which hinges the question of the adequacy of your ventilation. The Fifth Left and Sixth Right Entries are in good condition, with an exception noted on the following sheet. The matter of the Fifth Right is discussed on the sheet following made part of this Notice. That entry needs better ventilation.

*1.—Intake Air.*

I found a volume of 7,452 cubic feet of air entering the bank—measured just back of the First Left—ample for all needs if conducted through the works.

Sufficient went to the Fifth Left to supply the work there, and leave a surplus of 2,144 feet for the next entry (the Sixth Right), and sufficient is carried through the rooms. But at the entrance to the air-course for the Sixth Right—in the break-through from the Main—there was evidence of a loss of air. Here we should have found all the air traveling—certainly all that had entered the Fifth Left (3,944 feet)—but the volume amounted to only 3,146 cubic feet. This, however, is still enough, with only 16 persons in Fifth Left and 15 in Sixth Right, but there is none to spare; so that the work on the Sixth [Fifth] Right, with 18 persons, is left without an adequate volume, if that entry is to be aired by the current which first travels the Fifth Left and Sixth Right.

*2.—The Sixth Right Entry.*

The head of the entry is too far ahead of the air—60 feet. Another break-through is necessary from the air-course. When the rooms are 60 feet long, the air must be turned into them. Except as to the head of the entry being too far ahead of the air—and I recognize the fact that there was excuse for this—I have no complaint to make concerning this entry's ventilation.

*The Fifth Right Entry.*

This entry is not adequately ventilated from any point of view. If it is to depend on the current which comes from the Sixth Right, then the volume of air is insufficient; and not only that, but this entry being open to day, the current baffles.

Either this entry should be aired by itself, if it can be done without decreasing the volume of air that travels the Main, or a larger percentage of the volume which enters the Main (7,452 cubic feet) must be carried round the works. I should prefer to air this entry by itself. The condition of the furnace, however, indicates that its capacity for passing air is small, hence careful management will be required to prevent the furnace from receiving an undue proportion of air from the mouth of this entry. This must be managed by regulating the size of the orifice at the mouth of the entry, so as to limit the quantity of air that will enter. The air should then be directed into the rooms and carried down through them until it joins the Main current near the furnace.

Is it not possible to save a larger percentage of the air that now enters the Main?

4.—The Furnace: Your furnace is in a very poor condition, and I am surprised that you are getting the results you do from it. It is choked at the air-shaft end, there being an open space of only 12 or 18 inches in height at the end of the furnace. Were it not for the hole above the furnace, very little air would pass, no matter how strong a fire might be kept up. Moreover, the placing of the furnace immediately at the shaft was a mistake.

5.—I am much gratified with the great improvement made in the drainage and roads.

No. 273.

LAUREL MINES.

February 8, 1892.

J. W. Bastin,

Secretary and Superintendent Laurel Coal Company,

Pittsburgh, Ky.

DEAR SIR: You are respectfully notified that on January 26, 1892, the date of inspection, your mine, the Laurel No. 2, was in excellent condition as to ventilation. While the mine in places is very wet, I recognize the fact that efforts are being made to obtain good drainage, and that the position of the workings at present—apparently in a large basin—renders the



task very difficult. I hope to look into this matter in more detail later on.

I have, therefore, but two complaints to make: The face of the Main Entry is entirely too far ahead of a break-through for air, being 118 feet ahead; and the air should be carried to the head of the 3d Left Entry.

The fire being quite low when I reached the furnace, I did not attempt to measure the capacity of the latter.

The following measurements of air were made in the air-course leading from the Roup Entry to the Third Left:

When the door on the Main is not kept closed all the time, but is opened occasionally for trips to pass. . . . .	4,806 cubic feet.
2.—Average of two measurements when door is closed . . . . .	8,351 " " "
3.—Maximum measurement when door is closed . . . . .	8,849 " " "

No. 274.

UNION MINE.

February 8, 1892.

Thompson Jeffrey, Esq.,

Manager Union Coal Company,

Pittsburgh, Kentucky.

DEAR SIR: You are respectfully notified that on January 27, 1892, the date of inspection, you were working your mine, the Union, in violation of section 11 of the Mining Law, a copy of which has been furnished you.

Statements made herein are framed as if made on the day of inspection.

The condition of your mine has been greatly improved since the last inspection, but the ventilation is insufficient for the number of persons employed.

With 60 to 62 persons in bank, there should be not less than 6,200 cubic feet of air traversing the works. But even at the furnace, where advantage is had of leakages, I found a volume of only 5,953 cubic feet, and that, it must be remembered, represents more air than actually traverses the works.

The *quantity* of air sent through the bank should be increased, and it should be sent more thoroughly through the rooms on both sides of the Seventh Left Entry.

All work on the Eighth Left, beyond the air-course leading to the Seventh Left, is ahead of the air. I note the fact that a second air-course beyond the first one is expected to be completed soon; but the head of the entry is still 68 feet ahead of that.

No. 275.

STAR MINE.

February 8, 1892.

Jonathan McNeill, Esq.,

For the Star Coal Company,

East Bernstadt, Ky.

DEAR SIR: You are respectfully notified that on January 29, 1892, the date of inspection, you were working your mine in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

1.—You are depending on natural means for ventilation, and have been since the work was transferred to the Williams Entry.

2.—Provision is not made so that the air will *travel the rooms instead of the entry* on either the "Williams" or "Durham" Entries.

3.—A furnace, or equivalent, must be provided for securing ventilation, and the air must be carried through all the working rooms on both the Williams and Durham Entries.

No. 276.

REINECKE MINES.

February 15, 1892.

Inkerman Bailey, Esq.,

Secretary Reinecke Coal Company,

Madisonville, Kentucky.

DEAR SIR: You are hereby respectfully notified that on February 13, 1892, the date of inspection, your mine, the Reinecke, was, as far as examined, in fair condition—exceptions thereto being noted herein.

Only one-half of the mine, the "East Side," was examined. For the reason that it was necessary to cool the steam boilers in order that they might be inspected—which stopped the working of your hoisting and ventilating machinery during the latter half of the day—I had to defer the inspection of the "West Side."

Statements herein are framed as if made on the day of inspection.

*Volumes of Air.*

In the break-through from the Second East to the First East Entry, next above No. 19 room on the latter entry, I found 11,139 cubic feet of air. This supplies the workings in which 25 to 30 persons are engaged.

In the Fourth East, near the mouth, I found 5,127 cubic feet of air. This supplies workings in which 7 to 8 persons are engaged.

In the No. 1 South Main, between the Third and Fourth West, I found 17,721 cubic feet of air flowing to the hoisting shaft, which is now used as the upcast.

*Defects Noted.*

*First East Entry.*

The roof is bad in several places a short distance back of the ninth room, and should be scaled and timbered.

There is no break-through between rooms 17 and 18. I note that one has been started.

Room 19 is up nearly far enough for a break-through.

*Second East Entry.*

Rooms 17, 16, 15 and 14 are all up about far enough for additional break-throughs.

*Fourth East Entry.*

The third room, which is in 55 feet from the entry, should have a break-through to No. 2 room promptly upon reaching the required distance. I could hear gas singing distinctly at the face, especially on the left-hand rib. The face of No. 1 room is 78 feet beyond the break-through to No. 2 room—18 feet too far. I note that a second break-through is being made, about ten feet back from the face, to No. 2. Gas can be heard plainly at the face.

No. 277.

## MADISONVILLE MINES.

February 15, 1892.

C. E. Morton, Esq., Sec. and Treas. Madisonville Coal Co.,

Madisonville, Ky.

DEAR SIR: You are hereby respectfully notified that on February 12, 1892, the date of inspection, you were working your mine, the Madisonville, in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

On account of the amount of fire-damp evolved by the coal, and the defects of the ventilation, your mine is in a dangerous condition.

See specifications on the following sheets forming part of this Notice.

*First East Entry.*

The first room has been driven up 80 feet without a break-through for air, and is now standing. Fire-damp is accumulating in it, and it should not be entered with a naked light. It should be cleared of what gas has accumulated in it, and gas prevented from accumulating (until a break-through is made from No. 2 room into it) by means of a brattice, which may be made of cloth, thus:

(A diagram was given here.)

The work of carrying up the brattice should be done with a safety-lamp. The other rooms are not up the 60 feet permitted by the law before a break-through should be made, but break-throughs should be made promptly when that distance is reached.

This entry has been carried entirely too far ahead (100 feet) of the air. No more work should be done at the face until the second break-through to the Second East Entry is connected with that entry. (The Second East is not far enough up to catch that break-through yet—being about 9 feet behind. This break-through and the Second East Entry should be connected at once, and the present open one then closed.) The head of the entry is 69

feet beyond the second (unfinished) break-through, so that even when the air is brought up and sent through the second break-through in question, the face of the entry will still be too far ahead of the ventilating current. This entry, therefore, should not be carried further until the Second East is brought up even with it, and a break-through made at the face of this entry into it.

*Second East Entry.*

The first and second rooms, although driven up fully 60 feet, have no break-through between them. This should be corrected at once; and a break-through should be made from the First to the Second South Entry, and the air made to sweep the faces of the first and second rooms.

*Second South Entry.*

The face of the entry is 80 feet ahead of the last break-through to the Main, and fire-damp is rapidly accumulating there. I note that a second break-through is being made, which will bring the air within 10 feet of the face, and about another day's work is required to put it through.

The roof of this entry is very bad by and in the neighborhood of the present break-through into the Main Entry. It should be well timbered.

*The Main Entry.*

The face has been carried 75 feet beyond the break-through for the air. I note that another break-through is nearly done, which, when the rear one is closed, will bring the air within about 5 feet of the face.

The roof of this entry is bad by and in the neighborhood of the present open break-through from the Second South, and by and in the neighborhood of the Second West Entry; it should be well timbered.

*The Second West Entry.*

In consequence of curtains being used instead of doors, the air-current is unsteady when it reaches this entry, and comes in gusts. Although a volume 23,875 to 25,488 cubic feet of air is coursing the Main just outside the First East Entry, the best measurement I could get in this one showed only 4,892 cubic

feet, and that was intermittent. With the amount of fire-damp that is issuing from all the workings in your mine, the current should be kept steady; hence doors should be substituted for the curtains at points where the main ventilating current is to be checked. The first room is driven up 60 feet about, and the air is not turned into it. It should be carried no farther until the second room is brought up and a break-through made between the two, and the air carried through them. No work should be done with a naked light (*i. e.*, without a safety-lamp) where there has been a chance for gas to accumulate.

It is particularly important, on account of the abundance of fire-damp in your mine, that the requirements of the Mining Law, with reference to ventilation, shall be strictly complied with. In fact, it would be wise for a time to endeavor to keep the air nearer than 60 feet to the working places, and great care should be exercised as to the use of naked lights. The Section requiring the working places to be examined for gas (see Section 11) should be carefully complied with. By the exercise of rigid care, you may succeed in getting your mine opened and well developed without an explosion, but such will not be the case unless every precaution is taken.

No. 278.

ALTAMONT MINES.

March 21, 1892.

C. Crooke, Esq., President Altamont Coal Co.,

Altamont, Ky.

DEAR SIR: You are hereby respectfully notified that on March 10 and 11, 1892, the date of inspection, you were working your mine, the New Works (*i. e.*, Mine No. 2), at the "New Mines," in violation of Sections 11 and 3 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

The ventilation is so exceedingly defective, notwithstanding that a volume of over 20,000 cubic feet of air was passing up the up-cast, that it is hardly necessary to specify particular parts of the mine. The whole system will have to be improved.

Where the most men are at work, and where the most room-work is (i. e., in the Ferrall, and right-hand entries leading from the Main Porter), there the ventilation is most deficient—not only as regards quantity of air supplied but with respect to its distribution.

*Bossee No. 2 Entry*—Sixteen persons.

Most of the work on this entry is, I believe, on pillars. But there is work in seven rooms that are beyond the course for the ventilating current—beyond the last room open to the Clay Entry. Those rooms, therefore, are without ventilation. Air should be sent to them, and carried *through the rooms* on both sides of the entry—in accordance with the requirements of Section 11. There is no provision for sending the air into any of the rooms on the left.

*Clay Entry*—from Main Porter; 10 persons.

Most of the work on this entry is on ribs. But there are two rooms on the air-course that goes to Bossee No. 3—said air-course starting from the Clay at a point about 70 feet back from the furnace—which are up about 120 feet each without the air being turned into them. A volume of 8,019 cubic feet of air comes down the air-course, but it flows *past* the rooms mentioned. A check curtain should be placed so as to throw sufficient air into those rooms in accordance with the requirements of Section 11.

The volume of air flowing to the furnace from this entry amounts to 19,641 cubic feet. To this is to be added a volume of 985 cubic feet that comes from the room on the left, by the furnace, that connects with the Bossee No. 2 Entry. Total going through the furnace, 20,626 cubic feet.

There is no provision for sending the air through the rooms on the left, but it is probable that, with sufficient air entering Bossee No. 2 Entry, sufficient ventilation for any work to be done there may be derived from the air cutting across from the Bossee No. 2—the rooms between Clay and Bossee No. 2 being connected.

*Bossee No. 3 Entry*—6 persons.

Work here is in the first three rooms on the left. No arrangement is made for sending the air regularly through the

rooms, but it is allowed to travel wheresoever it may. The head of the entry is 31 yards beyond the last course for the air to the Clay. I understand that it is the intention to again drive the entry ahead. Before this is done, provision must be made to carry the air up so as to keep work ventilated in accordance with the provisions of Section 11.

*The Potter Entry.*

There is no work here now, but I understand that the suspension is only temporary. According to present arrangements, if they were perfect, the entire current (except that portion for the Bossee No. 2) should be traveling here; but I could measure a volume of only 2,844 cubic feet—which indicates an immense total of leakages to the entries nearer the furnace, since the amount going to the furnace (omitting that from Bossee No. 2) is 19,641 cubic feet.

*Note A.*

The workings in the foregoing entries, which are on the left of the Main Porter, are chiefly on pillars, and have the advantage of contiguity to the furnace entry (the Clay). They are, therefore, less injuriously affected by the deficiencies of the ventilating arrangements than are other portions of the bank; and they may readily be given good ventilation.

*The Morgan Entry—15 or 20 persons.*

This entry is practically without ventilation. Very little current comes to it—less than enough to affect the anemometer in an 8-foot passage—and what does come is of no service to the rooms. In fact, all the work is beyond the present course that is open for the passage of the current, so that, even were there an ample volume of air coming to the entry, it would not pass to the places at which it is needed. There is no provision for turning the current into the rooms on the left (in five of which there is work in progress), even were there sufficient air coming. The rooms on the left were at one time provided with curtains, but the curtains have, in a number of instances, been torn away. Since, however, there is no provision for turning the air into the rooms, the absence of the curtains is rather beneficial than otherwise. But the short of it is, the entry is not provided with ventilation.



*The Livingston Entry*—40 persons. Under the name "Livingston" there are here two entries, one of which I shall designate as Main Livingston, and one turned from it on the left, which I shall refer to as Livingston No. 2.

Both entries are practically without ventilation.

Nearly all the work is on the Livingston No. 2, there being, as I understand it, only two rooms (the 4th right and 5th left) working on the Main Livingston.

To supply Livingston No. 2, having, say, 36 or 38 persons thereon, there is a volume of only 1,267 cubic feet of air coming from the air-course that leads from the North or Ferrall entry; and even that current is very inconstant. Moreover, it is expected to supply persons on the Ferrall entry before reaching the Livingston (which, however, it fails to do, in consequence of the defective arrangements there). Again, this current, even if constant, is of very little service to Livingston No. 2. It does not pass to the working places. There are two rooms working on the right above the course for the air and three above it on the left. There is no provision for compelling the air to travel through the rooms on the left, in some instances even break-throughs being absent. This Livingston No. 2 entry is in very bad condition with respect to ventilation; in the upper portion the atmosphere is very smoky and unhealthy.

The water is pumped out of the Livingston entry—though the accumulations are not kept down—into the Main Porter, the pipe emptying into the latter just outside the door on the Livingston. It is not emptied into a ditch, but simply on the entry. This makes the entry wet and muddy, and should be remedied. It is detrimental to the health of the miners to have to tramp to and from their work in such wet entries, and in instances like this it should be unnecessary. (See Section 3 of the Mining Law.)

Posts should be set on the left, where Livingston No. 2 starts from Main Livingston. (See Sec. 3.)

*The Main Porter Entry.* This entry is very wet and muddy nearly all the way from the Livingston Entry to the swag that is between Livingston and Ferrall entries. At this swag the roof should be well timbered. It is dangerous. (See Sec. 3.)

*The Cartwright Entry*—15 or 20 persons. Fortunately the

work here is chiefly on pillars ("slabbing ribs"), hence the evil effects of lack of system in the ventilation are not felt so much as otherwise would be the case. The entry also has the advantage of connections, by rooms driven through to rooms coming from the Ferrall, through which the air which enters the Ferrall travels.

*The North or Ferrall Entry*—34 persons. The ventilative conditions on this entry are so extremely bad—especially from the 26th room on to the head—that it is unnecessary to enter into specifications. The short of it is, that the entry is without adequate ventilation anywhere, and in the upper portion there is no ventilation, notwithstanding that a shaft has been sunk on the "Clay"—turned off from this entry—for the purpose of giving it.

*Note B.* I understand that you are preparing to lay track again in "Bossee No. 1" and in "E. Daniel" entries, for the purpose of drawing the pillars thereon. Provision must be made to ventilate them when that is done.

*Note C.* I have a letter from your Mr. Richardson, who has recently taken charge as Superintendent of your mines, under date of March 19, in which, if I understand him, he proposes to gather the miners together and work out the pillars in the several blocks, one after the other, and fence off the other works. I have endeavored to use the maps of your mine—the extensions for the two periods of 1891—as a basis upon which to formulate a suggestion for bettering the ventilation without incurring the large expense for doors, stoppings, etc., of which Mr. Richardson speaks, but the maps are so inaccurate that any suggestion based upon them would have little value. The inaccuracy of the maps become immediately apparent upon attempting to join them, and rooms are shown on them where, according to my own notes, there are blanks. If the maps are fitted so as to make the lines of two certain entries coincide, then the other entries are thrown entirely out of line with each other. Thus the relative positions of the rooms in two parallel entries as shown are entirely inconsistent with the facts. Mr. Richardson, being constantly on the ground, has, of course, considered the question of depth of "surface ground" above the blocks from which he will re-

move the pillars, and will, therefore, guard against trouble from water. I may say, in a general way, that I heartily approve of working the coal out in blocks wherever the surface conditions will permit it.

No. 279.

ALTAMONT MINES.

March 21, 1892.

C. Crooke, Esq.,

President Altamont Coal Company,

Altamont, Ky.

DEAR SIR: You are hereby respectfully notified that on March 11, 1892, the date of inspection, you were working your mine, the No. 1 Mine at the New Mines, in violation of Sections 3 and 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

There were only 23 persons employed in bank on the day of inspection, the East Daniel Entry, upon which 25 or 30 had been employed, being temporarily idle.

There was no fire in the furnace, and had not been for three days, hence there was no regular current, and what did travel was too small in volume to be measured.

An inspection was made, then, to see how the current would travel with reference to the active workings when one was passing. The result shows that in nearly all cases it would simply travel the entries, instead of ventilating the working-places.

*Hardscrabble Entry*—8 persons. The work here consists of drawing stumps, and, although it is clear that the ventilating current does not serve this entry, the work is now in such condition that it is probably unnecessary to undertake to send the air systematically to it. This, however, depends upon how much longer the work will last. If there are several months of work there yet, then special provisions for affording ventilation to the workings must be made.

*Wassum Entry*—6 persons. These persons are engaged in rooms—two of them being in rooms on the left, back of the Payne Entry, and four being in rooms on the right, back of the

**Leverage Entry.** No provision is made for turning the current into the rooms so as to give them ventilation.

*Leverage Entry*—4 persons. These persons are in rooms—two on the right and one on the left. They are without ventilation.

*“Air-course” Entry*—5 persons. These persons are in rooms on the left. No provision is made to afford them ventilation by turning the current into them.

*The Main Entry*—The roof of this entry requires attention clear to the Wassum Entry.

No. 280.

KENSEE MINES.

March 22, 1892.

Hywell Davies, Esq.,

Gen. Manager Main Jellico Mountain Coal Co.,

Jellico, Tenn.

DEAR SIR: You are hereby respectfully notified that on March 14, 1892, the date of inspection, you were working your mine at Kensee in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

I am pleased to state that the general condition of the mine has been very greatly improved; that, indeed, it is in a better condition in all respects than I have found it at any one of several past inspections; but, as will appear in the following notes, there are nevertheless defects in the ventilation—as regards both quantity and distribution of the air—in portions of the bank which need to be remedied.

#### *Intake of Air.*

Measurements of the intake of air were made on No. 20 Entry, a short distance back (outside) of the door. They resulted as follows:

Highest of the readings.	.....	16,829 cubic feet.
Lowest	“ “ .....	16,171 “ “
Average	“ “ .....	16,488 “ “

Measurements made with the anemometer of Mr. Wm. Jones,

Superintendent, showed: Highest, 14,701 cubic feet; average, 14,122 cubic feet. But I am satisfied that Mr. Jones's instrument reads too low.

*No. 21 Back Entry*—10 persons. There is no adequate ventilation for this entry, the current not being carried into it. A door or check-curtain is needed on the cross-cut from No. 20 Entry to direct the air into this entry, and the air should be carried to the head—with brattice if necessary—so that all the work here shall be ventilated according to Section 11.

*No. 21 Entry*—16 persons. There are 10 rooms on the entry. There is no provision (as a check curtain) for sending the air into the rooms on the right, yet they are 120 feet (No. 2 room), 60 feet (No. 3), 60 feet (No. 4), and 150 feet (No. 5) long. On the left the air does not travel close enough to the faces. The course for it is only 24 to 30 feet beyond (inside the rooms) the mouths of the rooms, and yet the rooms are (No. 2) 150, (No. 3) 120, (No. 4) 60, and (No. 5) 105 feet long. The air does not reach the 5th room, since the mouth of the 4th is open. In the break-through from the 4th to the 3d room 4,487 feet of air was traveling, a large part of the volume which starts to this entry being intercepted by leakages. It will be seen, however, that there is plenty of air for both 21 Entry and 21 Back Entry; it only needs to be properly directed to the working places.

*No. 20½ Entry*—38 or 39 persons. At the head I measured a volume of 7,724 feet of air. This, granting the air to have traveled the course that it should have followed, gives 7,700 cubic feet for 65 persons, which would leave 5,100 feet available for this entry; an ample amount, if it is sent properly to the working places. But it is not so sent. From Room 28 on to the head it travels altogether on the entry. The rooms through which the air is not sent are up the following distances (roughly stated):

Room 28 and 29 (double.)	Up 90 feet.	Has 4 persons.
“ 30 (double).	“ 105 “	“ 2 “
“ 31 “	“ 105 “	“ 2 “
“ 32 “	“ 105 “	“ 2 “
“ 33	“ 60 “	“ 2 “

These, it will be seen, are from 30 to 45 feet too far in from the air, except No. 33, which has just reached the limit permitted by law.

The other rooms, beyond the foregoing, through which the air is not sent, but which are not yet up to the 60-foot limit, are as follows :

Room	34.	Up	45	feet.	Has	2	persons.
"	35.	"	30	"	"	2	"
"	36.	"	25	"	"	1	"
"	37.	"	25	"	"	1	"
"	38.	"	25	"	"	3	"

Provision should be made to send the air into and through rooms 28, 29, 30, 31, 32 and 33, so as to bring it at any rate to a line not more than 60 feet back of their faces (see Sec. 11), and care must be taken to keep it within the legal distance of the faces of the other rooms as they are being driven up.

*No. 20 Entry*—Persons in space between the head and the haulway to No. 18½ Entry, 12 ; persons between said haulway and mouth of entry, 2.

The persons working outside the haulway to No. 18½ Entry may be omitted for the present.

There being only 12 persons here, there is just enough available current left to satisfy the demands of this entry between the head and the haulway to No. 18½ ; the persons on No. 21 (both entries), 20½ and this entry, numbering in the aggregate 77, while the current provided for them amounts to 7,700 cubic feet.

There are only three rooms up 60 feet or more, namely, No. 35 (60 feet), No. 34 (135 feet) and No. 33, but No. 36 lacks only about 10 feet of being up to the 60-foot line. The air is not turned into them. Those rooms which have reached the 60-foot limit should have the current turned into them, and care should be taken to observe the requirement of Section 11 as the faces of the other rooms are advanced.

The two rooms (29 and 30) just outside (back of) the haulway to No. 18½ Entry get no ventilation. This should be remedied.

*No. 18½ Entry*—11 persons. By the time this entry is reached the supply of available air—that is, the volume left after making deductions for the necessities of the preceding entries which it must have traversed—is exhausted. There is a volume of 5,094 feet on the entry—say, 5,100 feet. But that is air which

has already served for the preceding entries with—omitting 21 Back Entry—67 persons on them. Hence this entry is without its quota, or even a part of its quota, of fresh air. According to the way the air is intended to be coursed there should be, instead of 5,100 feet, not less than 8,800 cubic feet traveling here—a deficit of 3,700 cubic feet. According to the way it actually is coursed (No. 21 Back Entry being omitted) there should be not less than 7,800 cubic feet traveling here—a deficit of 2,700 feet.

My impression is that the losses are attributable in part to the leakages at the door on the haulway between No. 18½ and No. 18 entries, but more especially to leakages that come across old workings from No. 20 entry to No. 18, and thence to the haulway that goes to No. 14. As will be seen presently, there is sufficient air found on said haulway just beyond No. 16 entry to satisfy the demands of the bank; there being 13,000 feet there, of which 4,217 feet come from the No. 16 Back Entry.

Not only is the volume of air from 2,700 to 3,700 feet short here, but provision is not made for sending the current through the rooms as required. From room 22 on to the head, the air travels the entry exclusively; yet there are a number of rooms which have been driven up 60 feet or more, namely:

Room 24, temporarily idle . . . . .	Up 150 feet.
“ 25 } “ “ . . . . .	“ 150 “
“ 26 } Double.	
“ 27, 3 persons . . . . .	“ 150 “
“ 28, 1 person . . . . .	“ 150 “
“ 29, 1 “ . . . . .	“ 150 “
“ 30, 1 “ . . . . .	“ 105 “
“ 31, 2 persons . . . . .	“ 105 “
“ 32, temporarily idle . . . . .	“ 105 “
“ 33, “ “ . . . . .	“ 90 “
“ 34, “ “ . . . . .	“ 60 “

Not only should a larger volume, or a distinct and sufficient split of fresh air, be given to this entry, but it should be sent into the rooms so as to sweep within at any rate 60 feet or less of the faces.

*No. 18 Entry*—8 persons. Since this entry gets its air from No. 18½, the shortage of volume is here increased to 3,300 or 4,300 feet. No provision is made for carrying the air through

the rooms. Two of the rooms which are still advancing, are up 90 feet and 30 feet, respectively, too far without the air being turned into them. There are quite a number of rooms, now temporarily idle, that have been carried up distances varying from 75 to 150 feet without the air being turned into them. This matter of carrying the air through the rooms must not be so neglected.

*No. 16 Entry*—16 persons. Plenty of air enters this entry, but there is no provision for turning it into the rooms, and nearly every room is up too far without that being done, thus:

Room 2 Left	is up	135 feet.	In it are	2 persons.
" 3	" " "	105 "	" " "	2 "
" 4	" " "	75 "	" " "	2 "
" 5	" " "	75 "	" " "	2 "
" 6	" " "	60 "	" " "	2 "
Room 1 Right	" "	120 "	In it is	1 person.
" 2	" " "	120 "	" " are	2 persons.
" 3	" " "	60 "	" " "	2 "

*No. 16a Entry* (off the haulway to No. 14)—7 persons. This entry is without ventilation. There are two rooms started on it, and the entry is being carried ahead.

*Cross-cut to No. 14.*—On the Cross-cut to No. 14 Entry, a short distance below the mouth of No. 16a Entry, I found 13,496 cubic feet of air, say 13,500 feet—only one reading being taken. This was only 2,671 cubic feet less than the lowest measurement made on No. 20 entry, 3,329 less than the highest, and 2,942 less than the average.

*No. 16 Back Entry*—19 persons. Plenty of air comes to this entry, there being 4,217 feet, but it is not carried through the rooms as it should be. Beginning the count at the cross-cut leading from the No. 18 Entry, the following rooms (omitting those in which pillars are being drawn) are too far up without the air being carried through them:

Room 1 Right,	Is up	180 feet,	Has	2 persons.
" 2 "	" "	165 "	" 2 "	"
" 3 "	" "	165 "	" 2 "	"
" 4 " temporarily idle.	" "	" "	" "	"
" 5 "	" "	150 "	" 2 "	"
" 6 "	" "	135 or 150 feet,	" 1 person.	"
" 8 " on pillar,	" "	" "	" 1 "	"
" 4 Left,	" "	150 feet,	" 2 persons.	"
" 5 "	" "	185 "	" 2 "	"

The roof is dangerous by the 8th room on the right.



*No. 19a Entry.*—This is the entry that is being driven around the old workings from No. 19 to the mouth of No. 19. It is not ventilated.

I have verbally called the attention of Mr. William Jones, Superintendent, who accompanied me, to the necessity for improving the condition of the roof at several points in the mine.

In accordance with the rule long since adopted by this office, a copy of this notice will be furnished the Bank Committee of your mine.

As a suggestion, permit me to remark that I believe a system of examination of the roofs of the rooms before the men enter in the morning would greatly tend to diminish the chance of injury from falls of top. I would be glad if you could adopt some such arrangement.

No. 281.

ÆTNA MINE.

March 23, 1892.

Capt. W. A. Pugh,

Pittsburgh, Ky.

DEAR SIR: You are hereby respectfully notified that on March 12, 1892, the date of inspection, you were working the Ætna banks in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

*1st. The "Black-Jack" Entry Bank*—9 persons. You are depending on natural means for ventilation, which is especially prohibited by section 11. There is practically no current at all where the workings are in progress. And even were a good volume of air provided for the bank, no arrangement has been made to force it to ventilate the excavations where the miners are at work. The following diagram illustrates the situation:

(A diagram was given here.)

It is estimated by Mr. James H. Collins, Bank Boss, that you have seven months of work in this place. There is no ventilation; the atmosphere is very "close" where the men are working, and it is necessary for measures to be taken to improve the

conditions, both by having a fire kept up in the ventilating shaft, and by having the air properly travel the working-places.

2d. *The "Dog Entry" Bank*—9 persons. Here also natural means are depended upon for ventilation contrary to law ; and even were there a good volume entering the bank, the workings are such shape that they will get no ventilation. At present none of the rooms, of which there are four working, are in very far, but they are all beyond the course for the air. The following diagram will illustrate the situation :

(A diagram was given here.)

Provision for a constant adequate supply of air must be made, and it must be carried up to the working places, and kept within the distance of the working faces specified by Section 11.

Mr. Collins estimated that there are about seven months of work at this place.

No. 282.

DOWLAI'S MINES.

March 23, 1892.

Philips Francis, Esq.,

Superintendent East Tennessee Coal Company,

Jellico, Tennessee.

DEAR SIR: You are hereby respectfully notified that on March 15, 1892, the date of inspection, you were working your mine, the "Dowlais," in violation of Sections 11 and 3 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

I was unable to examine No. 3 Drift, because of an accident to my anemometer when making a last measurement of air in the older bank.

The bank, as regards both quantity of air per person and the circulation thereof, is in a better condition than when last inspected. This may be attributed to the reduction of the force in the bank, to the fact that places then working have been finished, or nearly so, and to the fact that the work in some of the entries is now nearly all on pillars—where the current can have free play—as well as to the fact that the air is gathered

together better. But in some parts, as noted on the following pages forming part of this Notice, the ventilation is very deficient, and the drainage is defective.

The work is divided into two districts, as regards ventilation, having for their respective intakes the Logan and Grubbs entries.

*I.—The Logan Ventilation District.*

The volume of air entering the Logan Entry amounts to 3,192 cubic feet. It is expected to supply 29 persons on the following entries, in the order they are intended to receive the air:

1. *The Logan Entry*—Only five persons are now working here, four others having just finished a room in which they had been working. One room, in which two persons are engaged, is on a pillar, and is connected with the Secres, so that there is plenty of air given to it. The 6th Left room, in which three persons are engaged, is up 160 feet, and is not connected with the Secres entry. The only way in which it gets ventilation is by connections with rooms that go through to Secres.

Perfectly accurate measurements could not be made of the amount of air entering the mouth of this entry, from day, but concessions were made for area that render it safe to conclude that the measurement taken—3,192 cubic feet, say 3,200 cubic feet—is the average volume. (This is 1,037 feet more than was measured at the last inspection.)

2. *The Secres Entry*—12 persons. The work on this entry is sufficiently ventilated, unless rooms 4 and 5 Right are to be excepted. They should be connected and a connection made with Logan so that the air will sweep by their faces. The drainage of this entry needs to be much improved, from the 6th Right to the 10th Right rooms.

3. *Davis Entry*—2 persons. The work here is on stumps, and, while there is not a regular current in the entry, there is sufficient air to supply the needs of two men engaged as those in question are.

4. *4th Left Entry*—2 persons. The work here is on stumps, and, while there is not a regular current here, the men, being only about 120 feet from the Second Main Entry, can not suffer for air.

5. *5th Left Entry*—4 persons. There is one room going on

this entry, in which 2 persons are engaged, and 2 persons are pulling stumps. The latter work is to be suspended, leaving only the 2 men at work in the room. This room is outside the regular course of the air, and can only get such benefit as may result from leakages into this Entry from the Second Main, and thence across to the 6th Left.

*Note A.*—On the Second Main, between the 4th Left and Se-  
cres entries, I obtained a measurement of 4,052 feet of air. This includes the intake from Logan and some air that comes up the Second Main from old workings.

6. *6th Left Entry*—4 persons. The work here is in two rooms, Nos. 12 and 13, one double (3 persons) and one single.

Entering this entry from the Second Main is a volume of 4,568 cubic feet of air. Part of this air is leakage from the Grubbs entry district. In my hurry, I neglected to ascertain whether the rooms here, Nos. 12 and 13, are getting proper ventilation. I regret this oversight. I understand that they are driven up about 175 feet each, and that it will require about one month's work to drive them up. I can now only call attention to them, and say that if they are not so connected as to receive a current of air, provision therefor should be made.

The roof of this entry needs immediate attention all the way from the No. 1 Main to the No. 2 Main. It is dangerous in many places. The attention of Mr. John Jones, Bank Boss, was verbally directed to this when we were in the entry.

## II.—*The Grubbs Ventilation District.*

The volume of air entering the Grubbs entry amounts to 6,033 feet. (This is 3,895 feet more than was entering at the last inspection.) This is expected to supply 42 persons on the following entries, in the order they are expected to receive ventilation.

1. *The Smith Entry*—14 persons. This is the extension of the 7th Left entry beyond the Second Main. All the rooms on the left are curtained up to the 10th. All the work beyond that room—which consists of two rooms, one on the left and one on the right, and work at the head of the entry—is beyond the air. The leakage is very great back of the 10th room, so that when that room is reached the air is very dull, the current only slightly affecting even the lamp-flame. The air is consequently quite bad at and beyond the 10th left room. The entry-face is

118 feet beyond the said room. The ventilation of this entry should receive immediate attention, and the air carried to the head.

There is much water on this entry, due to the fact that it is in the bottom of a deep swag, and that the present "pumping" any syphoning arrangements seem to be utterly inadequate for the work of removing it.

2. *Seventh Left Entry*—10 persons. Entering this entry, from the Second Main, is a volume of 4,065 cubic feet of air, a loss of 1,968 feet from the amount of intake at the Grubbs Entry. (This loss is caught on the Sixth Left, and is a total loss for this district). There is still sufficient air, however, but it is not turned into the rooms. Instead, it is allowed simply to travel the entry. A check curtain should be hung between rooms 11 and 12, the air thus turned into them, and then sent through the rooms towards the Main.

This entry being in the deep swag heretofore mentioned, and the "pumping" arrangements being inadequate, there is a great amount of water on the entry. I am impressed with the belief that you will not be able to keep this part of the mine free from water without using a steam pump, or equivalent.

3. *Eighth Left Entry*—12 persons. Entering this entry from the Seventh Left, by an air-course starting from a point between the 6th and 7th rooms of the latter entry is a volume of 2,016 cubic feet of air. This indicates that at least a volume of 1,949 feet goes to the No. 1 Main direct from the Seventh Left. The amount coming to this entry (2,016 feet) is still enough, however, to satisfy the requirements for this entry, but the work on the No. 1 Main, beyond here, fails to receive its due share of fresh air.

The work on this entry is in five rooms on the right, and at the head of the entry. None of the rooms are up more than about 50 feet. Care must be taken to turn the air into them, and carry it through them when they reach the 60-foot limit specified in Section 11.

4. *No. 1 Main, beyond 8th Left Entry*—6 persons. The work here is at the head of the entry (2 persons) in the air-course (1 person), and in two rooms (3 persons). In consequence of the

rear break-through between the Main and its air-course being open, the work, which is above it, is not ventilated.

*Note B.*—It will be noted that the total of all the air gathered in the bank where it can be utilized amounts to only 10,085 cubic feet. And this is when the amount of "drag" has been greatly reduced, by the reduction of the extent of workings to be aired, from what it was when the last inspection was made, at which time the total of the intakes from Grubbs and Logan entries amounted to only 4,301 cubic feet. I am still of the opinion that as you increase your excavations on the new entries, and renew work on the No. 2 Main, beyond the Seventh Left, you will find the power of your present furnace utterly inadequate for the demands upon it; and I beg to renew my suggestion that when you come to provide greater power you will find a fan the cheapest and best means in the long run.

On the No. 1 Main, between the Sixth and Eighth Left entries, the air is so foggy, from the smoke and vapor from the lamps of the men congregated there, that at times it is almost an impenetrable mist.

No. 283.

PROCTER MINE.

March 24, 1892.

W. T. Lewis, Esq.,

General Manager Procter Coal Company,

Red Ash, Kentucky.

DEAR SIR: You are hereby respectfully notified that on March 17, 1892, an inspection of your mine, the Procter, (except the 3d Main and associate entries), showed that you are working some portions of the bank contrary to the requirements of Section 11 of the Mining Law, a copy of which has been furnished you, and that you are not observing the requirement indicated in Notice 266, served on you September 24, 1891, (received by you September 28, 1891), in regard to sending the air through the rooms (instead of simply along the entries) on Nos. 10 and 12 (New) and No. 21 entries.

The bank not being in operation, there was no fire in the furnaces, and I could obtain no measurements to determine the amount of air supplied to the workings.

Statements herein are framed as if made on the day of inspection.

*Smitty Entry*—4 persons. It will be necessary to carry the air through the second room on the left, and also through the left-hand one of the double-room on the right; and as the work on this entry is advanced, care must be taken to observe the requirements of Section 11, not only giving the rooms ventilation, but keeping the air within 60 feet or less of all the working faces.

*No. 2 Main*—The right hand cross-cut, towards the head of this entry, on which are three rooms, receives no ventilation. There is no provision for sending the air into the workings there. This should be remedied.

*New 12 and 10 Entries*—About 20 persons. The air is not carried through the rooms, so as to ventilate them as required by Section 11, but instead it is allowed to travel the entries solely. The rooms are up distances varying from 75 to 150 feet, and more. This matter of failure to send the air through rooms on these entries was noted in Notice 266. The conditions at the faces of the rooms must necessarily be worse now than it was then.

*Old 12 and 10 Entries*—About 20 persons. The same criticism applies to these entries, with respect to failure to send the air through the rooms, that is made with reference to the preceding ones. The work is chiefly on No. 10. The rooms are up 75 feet or more.

*No. 21 Entry, off 1st Main*—10 persons. The air is not turned into and carried through the rooms. There are two rooms working ahead of the course for the air. This same criticism with regard to failure to send the air through the rooms on the right was made in Notice 266. The matter must be remedied so as to comply with the law.

*No. 15 Entry off 1st Main*—The rooms are up distances varying from 40 to nearly 200 feet, and all will be driven up a distance of 200 feet. The requirement of Section 11, in regard to keeping the air within 60 feet or less of the faces must be observed.

No. 284.

## BRECKENRIDGE MINES.

April 19, 1892.

Jas. Heron, Esq.,

Supt. Breckenridge Company L'td,

Cloverport, Ky.

DEAR SIR: You are hereby respectfully notified that on April 6 and 7, 1892, the date of inspection, you were working your mine, the Breckenridge No. 3 Drift, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the dates of inspection.

This notice has been delayed by a pressure of work in other directions.

The ventilation of the mine is inadequate both as to volume of air entering the working portions, and as to the distribution of it.

The drainage needs much improvement. It is especially bad on the 9th and 8th, West entries, and on the No. 1 South (or Main) in their vicinity.

## SPECIFICATIONS.

## Persons in bank :

On the East side,	13
On the West side,	37
Total	<hr/> 50

Volume of air-current required to pass to 9th West entry and thence to fan—there being only one current used— 5,000 cubic feet.

On April 6th I found a current of 4,573 cubic feet in the air-course, just back of the 2d East entry, but at the point where the current enters the first left room off of the 9th West the volume had diminished to 1,118 feet. I am inclined to think that the first measurement (4,573 cubic feet) was for some temporary reason—probably the movement of an inbound train of wagons—higher than the normal one. In any event, the measurements show a volume below that required.

On April 7th the measurements, wherever the current was



found, were more uniform, and I think those taken that day more nearly represent the true volume of air usually passing. Entering the air-course in question, I found a volume of 3,410 cubic feet. Nearly this same amount (3,300 feet) was again found, on the 1st South, or Main, just outside the 7th West entry; and passing into the 2d West, on the course to the fan from the 1st South, or Main, nearly the same amount (3,556 feet) was again found. So I take the second day's readings as showing more nearly the normal amount of air that is entering the working portions of the mine. It will be noted that it is too "short" in every case.

*East Side Workings*—13 persons. As 1,536 cubic feet of air, measured at the break-through where the current passed into the 1st left room off the 9th West entry (April 7th), more than covers the amount required for this side, the workings here would be well ventilated if the air was sent into the working rooms. But such is not the case. On the 2d East entry there are 2 persons in a room, and on the 4th East there are 6 persons in two rooms (3 in each) which are not ventilated; the air simply flows along the entries, past the mouths of the entries.

*9th West Entry*—12 persons. A volume of only 1,536 cubic feet enters the break-through leading to the work on this entry. As this has had already to supply 13 persons, the air available for the persons on this entry amounts to only 236 cubic feet. Moreover, what air enters after entering the first working room goes directly to the entry and immediately to the entry leading to the 8th West Entry. Nearly all the work is beyond the course for the air. The head of the entry has been carried too far ahead of the current (about 137 feet); see Section 11. This entry is not adequately ventilated either as to the quantity of air or its conduction. As hereinbefore stated, the entire volume of the ventilating current should be coming here, and it should not be less than 5,000 cubic feet, with 50 persons in bank. The entry must be given an adequate volume of air, and the requirement as to keeping the air within 60 feet or less of the faces of the work must be observed. The break-throughs from the Main into the First Left room, and from that into the second room are entirely too small; the passway from such room is built too nar-

row, being so packed on each side with slate, and being so low that it is difficult even to crawl through. Of course, as this is the course by which the entire ventilating current is to travel, this constriction of the area increases the tendency of the air to leak to the 1st South, or Main, through old workings on the back stretch, and also to increase the direct leakage to the fan from the No. 1 Main towards the mouth of the drift.

*Eighth West Entry*—18 persons. This, practically, has no ventilation. The greatest volume it would receive would be 1,536 cubic feet, entering the 9th West, which is already nearly exhausted (as available air) before it reaches the latter entry. And even were there an adequate current coming here, no provision is made to turn the air into the rooms, keeping it within 60 feet or less of the faces. Three of the rooms working are even beyond the air-course intended to convey the current to the 7th West.

*First South or No. 2 Main*—Just beyond the 7th West entry a volume of 3,300 cubic feet of air was measured. It is chiefly due to leakages that have served no good purpose.

*Fifth West Entry*—3 persons. This is without ventilation. All the air is on the 1st South or No. 2 Main.

*Fourth West Entry*—4 persons. This is without ventilation. All the air is on 1st South or No. 2 Main.

*At the Fan*—A measurement taken at the fan shaft showed a volume of 9,153 cubic feet of air; ample for the requirements of the bank, if it was properly conducted.

*Drainage*—Your attention has already been called to this matter on page 1.

No. 285.

NALL'S MINE.

April 19, 1892.

C. L. Nall, Esq.,

Proprietor Nall's Mine,

Owensboro, Ky.

DEAR SIR: You are hereby respectfully notified that on April 8, 1892, the date of inspection, you were working your mine, the "Nall," in violation of the Mining Law, a copy of which has been furnished.

Statements made herein are framed as if made on the day of inspection.

A pressure of work in other directions has delayed this Notice.

Your mine would doubtless have been found in excellent condition had the furnace had a fire in it. As it was, the furnace was idle, and had been so, I was told, for a day or so, awaiting cleaning out, etc. As a consequence, there was very little ventilation in the bank. Both doors on the Water Entry, intended to direct the air into its proper course, are standing open, and it seemed as if they are allowed to stand that way. The farthermost door needs to be moved so as to throw the air into the next to the last room. The bank should not be worked without keeping a fire in the furnace, and the ventilating doors should be kept closed.

No. 286.

NEW HOLLAND MINE.

April 19, 1892.

D. W. Sloan, Esq.

Manager New Holland Coal Co.,

Owensboro, Ky.

DEAR SIR: You are hereby respectfully notified that on April 9, 1892, the date of inspection, you were working your mine, the New Holland, in violation of the Mining Law, a copy of which has been furnished you.

Statements made herein are framed as if made on the date of inspection.

A pressure of work in other directions has delayed this Notice.

You are depending on "natural means" for ventilation. Ventilation must be secured by fan or furnace, or equivalent artificial means; and the air must be carried into and through all the working rooms, and kept within 60 feet or less of the faces. (See Section 11.)

Sufficient propping is not, as a rule, done in the rooms. The props are kept too far back from the faces of the rooms, and in some of them there is very little or no timbering. Special reference is had to the following rooms:

1. John James's—No timbering.

2. Kelley's—Poor timbering. (Idle now.)
3. Geo. Maurick's—The roof is bad, and yet the timbering is poor and insufficient.
4. John Merlinger's—Needs to have timbering kept nearer to face.
5. Pat Boyle's—Not kept posted close enough to the face.
6. Tip Hornback's—Insufficient posting.
7. Bud Graham's—Not well enough posted.

The tendency is also to run the rooms too wide. This, with the failure to sufficiently post the rooms, and the irregular, unsystematic way in which the bank is being worked, is dangerous, and it is extremely probable that it will end in disaster either to the miners or to the bank if persisted in. I say this notwithstanding the claims that are made in regard to working in the Bon Harbor mines. The probability is that your mine will be a wet one—working it from the present opening—and when the water sours there will be great pressure on your pillars, and a poor floor to receive it. I strongly insist upon a more systematic method of working the mine. (See Section 3.) Timbering is needed on the Main Entry, by the pump.

It is to be regretted that your opening has been made at the extreme rise of the coal. Among other reasons, is the one that it will give rise to much trouble in securing drainage.

No. 287.

PEOPLE'S MINE.

April 19, 1892.

P. J. McNamara, Esq.,  
Proprietor People's Mine,  
Henderson, Ky.

DEAR SIR: You are hereby respectfully notified that on April 11, 1892, the date of inspection, you were working your mine, the "People's," in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

A pressure of work in other directions has delayed this Notice.

1. There are no safety-catches to your cages. I am surprised

at this, as I had your positive promise that you would have them placed on the cages by October 1, 1891. The matter has been placed in the proper hands, with respect to failure to comply with former Notices on this point. (See Section 11.)

2. There is no cover to the cage used for lowering and hoisting persons. I have given you notice on this point heretofore, and have had your promise to attend to it. (See Section 11.)

3. The safety-gate at the side of the shaft you are now using, at the ground landing, is off. (See Section 11.)

4. New timbering is badly needed to hold up the roof where the New Main leaves the Old Main entry. The entry should be re-timbered clear to the shaft. (See Section 3.)

Timbering is also needed at the high fall on the New Main entry, just beyond the point where the New Main leaves the old one. (See Section 3.) The place is dangerous.

Additional timbering and some cribs are needed on the New Main, on the right, between the first break-through into the parallel entry (or "return air-course") and the first room that is working. In fact, the entire entry should be gone over and strengthened: there are many insecure places on it. (See Section 3.)

The second room on the New Main (being the first one that is working) is being carried too wide for safety; it is from 32 to 40 feet wide. (See Sec. 3.)

The work in this mine is being conducted in such an unsystematic fashion—rooms going in no special courses, and being driven without any special reference to each other as to direction, and pillars being unnecessarily thick in one place and too thin in the other—that disaster will result if it is persisted in. I hereby protest against it.

No. 288.

HECLA MINE.

April 19, 1892.

W. T. Anderson, Esq.,

Sec. and Treas. Hecla Coal and Mining Co.,

Earlington, Ky.

DEAR SIR: You are hereby respectfully notified that on April 13, 1892, the date of inspection, you were working your

mine, the Hecla, in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of Inspection.

You are depending on natural means for ventilation, and there is practically no ventilation obtained in any way.

I note your statement and that of Col. Ford that you are now arranging to get a fan at an early day—that you were doing so before the time of my visit.

No. 289.

ST. CHARLES MINE.

April 19, 1892.

Barton Crutchfield, Esq.,

Supt. for St. Bernard Coal Co.,

St. Charles, Ky.

DEAR SIR: You are hereby respectfully notified that on April 13th and 14th, 1892, the dates of inspection, your mine, the St. Charles, was found to be in excellent condition; better than I have ever known it to be.

I am of the opinion, however, that you will soon need additional ventilating power.

No. 290.

CRABTREE MINE.

April 19, 1892.

R. M. Salmon, Esq.,

Sec. and Treasurer Crabtree Coal Mining Co.,

Ilsley, Ky.

DEAR SIR: You are hereby respectfully notified that on April 14th and 15th, 1892, the dates of inspection, you were working your mine, the Crabtree, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

1. The volume of air supplied the bank, with 63 persons in, is insufficient.

2. The air is not sent through the rooms and kept within 60 feet or less of the working faces. Instead, it is allowed, in nearly all cases, to simply travel the entry.

*Bone Entry*—7 persons. This being the regular intake, there should be not less than 6,300 cubic feet of air entering it and passing through the last break-through to the Cook Entry. But the best measurement obtained in the entry, between the 11th and 12th rooms, shows only 3,795 cubic feet.

One cause of the smallness of the current entering here, is the use of curtains, instead of doors, at the opening immediately connecting with the furnace entry, and especially at the one only a short distance from the furnace.

Rooms 31, 32, 34 and 35 are, respectively, up about 75 feet, but the air is not sent through them. This should now be done. (See Section 11.) In the last open break-through to the Cook Entry, through which (according to the ventilating plan adopted) the entire current for the bank should pass, a volume of only 3,650 to 3,696 cubic feet of air is flowing. There should be not less than 6,300 cubic feet. The entry has been carried 120 feet ahead of the said break-through before another one was started—just twice too far.

*Cook Entry*—36 persons. This entry is receiving only about 3,700 cubic feet of air from the break-through from Bone Entry, which serves as the regular passway for the air. There should be not less than 4,300 cubic feet for this and the preceding entry alone, and as the entire current is expected to pass this way, there should be not less than 6,300 cubic feet.

No provisions, such as check curtains, are made for sending the air into and through the rooms, and yet many of them are up more than one hundred feet. In one group of ten rooms (Nos. 37 to 27) four are up 105 feet, two up 90 feet; one up 80 feet, and three up 120 feet. In the group from No. 25 to 20, inclusive, three are up 135 feet; one up 120 feet, and two up 90 feet. In the group from No. 18 to 11, inclusive, four are up 90 feet (one of these, No. 15, has fallen in); two are up 105 feet; one is up 120 feet, and one up 135 feet. The air should be sent through all the working rooms and kept within 60 feet or less of the working faces.

*In the No. 4 Main Entry.*—A measurement made in this

*Smith Entry*—17 persons. As already indicated, this entry does not receive sufficient air, there really being no "available air" for it at all, after the Bone and Cook entries have taken up their quotas from the current. Rooms No. 1 to 8 inclusive are all up about 120 feet, but there is no provision for sending the air into them and keeping it within 60 feet of the faces.

*Drainage.*—There is considerable water on the Cook and Bone entries, but I understand that it is a temporary, incidental matter, and is being rapidly cleared away.

1st measurement, volume of air . . . . .	9,324 cubic feet.
2d     "     "     " . . . . .	10,656     "     "

The fire was too thick, too much ash in it, even when the second measurement was made, and in both instances the back of the grate was loaded with a pile of dead ashes, etc. The furnace is capable of doing much better work than it was performing, if a proper fire is kept up in it. To throw great lumps of coal on the fire is simply to waste heat that should go to raising the temperature of the upcast shaft. But however much air may be secured at the furnace, it will not give adequate ventilation, unless the defects noted in the statements concerning the work on the various entries are remedied.



No. 291.

BASKETT MINE.

April 20, 1892.

The Baskett Coal Company,

Baskett, Ky.

DEAR SIR: You are hereby respectfully notified that on April 11 (at night), the date of inspection, you were working your mine, the Baskett, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

Pressure of work in other directions has delayed this Notice.

There is plenty of air entering the bank for the number of persons inside (a total of 68) on both the North and South sides, but it is not kept close enough up to the work in some parts. It is particularly necessary in this mine to have the air kept close up to the working faces—certainly within 60 feet or less, as prescribed by Section 11 of the Law—on account of the fire-damp which is present. On account of driving rooms up only 60 feet, the tendency is to be less careful about this than perhaps would otherwise be the case. But it is so absolutely necessary that the requirements of the law shall here be followed to the letter—not only on account of the necessities of the men, but in order that due precaution shall be taken against explosion—I feel that I can not too strongly insist on this point. (See Section 11.)

The present plan by which your mine is worked does away with narrow work altogether. All entries (including the Main) are driven room width. The side entries—"Room Entries" so to call them—are turned from the Main at every 20 yards, and rooms are broken off from the side entries every 10 yards, and driven through from entry to entry. The rooms and entries are carried from 18 to 20 feet wide—that is the "rule." This leaves pillars 30 feet wide by 60 feet long. These pillars, as I understand it, are to stand until the boundary is reached, and the workings brought back. This is a cheap method, and would be safe enough, were it not that *there is too little propping done*. The roof of the coal you are working is deceptive. It seems strong enough to stand a very long time

without timbering, but nowhere will it do so. After a time it will begin to break and flake off, and when it once starts to do that it is difficult to save it. In the case of your mine, too, there is not only water in the upper measures to affect it, but there is gas to work on it. The present plan of scanty timbering, therefore, will not do. It is a dangerous plan. More props must be used, and they must be kept closer to the faces of the working places. Both the entries and the rooms must be more closely propped. (See Section 3.)

## MEMORANDA.

*The South Side.*

Persons on 1st Right Entry work . . . . .	6
“ “ 2d “ “ “ . . . . .	2
“ “ 3d “ “ “ . . . . .	2
“ at Head of Main Entry . . . . .	2
“ on 1st Left Entry work . . . . .	4
“ between 1st and 2d Left entries . . . . .	7
“ on 2d Left Entry work . . . . .	4
Total . . . . .	<u>27</u>

Volume of air starting from the downcast for this side, 8,094 cubic feet.

Volume of air that really traverses the workings, between 3,300 and 4,000 cubic feet. (Balance lost to the fan by leakages.)

*The North Side.*

Persons on 1st Right Entry workings . . . . .	11
“ “ 3d “ “ air-course . . . . .	3
“ “ 3d “ “ work . . . . .	4
“ “ 4th “ “ “ . . . . .	5
“ “ 5th “ “ “ . . . . .	2
“ “ 1st Left “ “ . . . . .	5
“ “ 2d “ “ air-course work . . . . .	4
“ “ 3d “ “ work . . . . .	3
“ “ 4th “ “ “ . . . . .	4
Total . . . . .	<u>41</u>

Volume of air starting from the downcast for this side, 5,927 cubic feet.

Total persons in bank, 68.

Total volume of air required for each side :

1. The South side . . . . .	2,700 feet.
2. The North side . . . . .	<u>4,100 feet.</u>
Total . . . . .	<u>6,800 feet.</u>

**Total volume of air entering the bank :**

1. To the South side . . . . .	8,094 cubic feet.
2. To the North side . . . . .	5,927    "    "
Total . . . . .	<u>14,021    "    "</u>

**SPECIAL NOTES.****I. The South Side.**

*1st Right Entry*—Better posting is needed, both in the rooms and on the entry. In the 1st left room, for instance, the props were found to be kept within only 15 feet of the face, and the same scantiness of propping was observable at the head of the entry.

*2d Right Entry*—There is insufficient ventilation in the work on this entry.

*2d Left Entry*—A volume of 3,360 cubic feet of air is entering this entry, being the total (nearly) that serves to air the workings on both the Left and Right sides.

Props are too scant in the work on this entry. Gas seems to be singing in the coal. (It may be well to remark here that the presence of fire-damp is not always manifested by a hissing sound; there may be considerable issuing from the measures, and no sound made.)

Between the 1st and 2d Left Entries: The work here is not sufficiently ventilated. The air is allowed to scatter too much, and not reach the working faces.

*1st Left Entry*—The work at the head of the entry must not be allowed to get more than 60 feet beyond the air. There is a right-hand room, being near the head of the entry, the face of which will soon exceed that distance, because the mouth of it is now some distance beyond where the air turns into a left-hand room to go to the fan. In an air-way leading to the air-course that goes to the fan—and which carries all the air that has traversed this entry—I found a volume of 3,392 cubic feet of air.

**II. The North Side.**

*1st Left Entry Work*—The air should be carried closer to the faces of the work here—particularly on the cross-cut that is being driven to connect with the old 1st Right Entry of the South side.

*2d Left Entry*—The work here is too far ahead of the air, but I note that a break-through is being made towards the head of the entry for the air.

*Note A*—The same general statement in regard to failure to prop the workings close enough applies to this side that has been made with reference to the South side.

*5th Right Entry*—The air must be brought up to the work at this place.

*4th Right Entry*—The first room on the right should be closed, so as to send the air through the second room and closer to the face.

*3d Right Entry and Air-Course*—The first break-through between this entry and its air-course should be closed and the second one completed at once, and the air sent through the latter.

*First Right Entry Work*—After leaving the second room of this entry, the air enters the entry—which at that point is going paralled with the Main—and travels down the entry, leaving most of the work on the right without adequate ventilation. This must be remedied, so that there shall be an abundance of air traveling all the working places here. No chances should be taken.

*The Shaft*—The timbering (boarding) of the hoisting shaft is warped in many places and needs careful watching. I think the stuff used for sheathing was too thin, and it would be well to re-inforce it where the pressure is greatest on it.

No. 292.

SPOTTSVILLE MINE.

April 21, 1892.

T. Shiver & Bro.,  
Spottsville, Ky.

DEAR SIR: You are hereby respectfully notified that on April 12, 1891, the date of inspection, you were working your mine, the Green River, near Spottsville, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

Pressure of work in other directions has delayed this Notice.

Your mine has unquestionably been very much improved. Its condition is better than I have ever before known it to be. But there are some evils that need to be remedied with reference to timbering and ventilation.

## MEMORANDA.

*Persons in bank :*

On the Stewart entry . . . . .	1
“ “ New Farrall entry . . . . .	2
“ “ O'Neill entry . . . . .	8
“ “ Lowry “ . . . . .	18
“ “ Eastin “ . . . . .	10
“ “ Holmes “ . . . . .	3
“ “ Page “ . . . . .	9
“ “ Old O'Neill entry . . . . .	3
“ “ John Roll entry . . . . .	6
“ “ John Roll air-course . . . . .	1
“ “ Old Stinson . . . . .	6
“ “ Jennings . . . . .	1
Total . . . . .	<u>63</u>

*Volume of Air.*

Although there is an ample volume of air entering the bank, and sufficient for all the work carried as far as the New Ferrall entry (where the two splits unite), it begins to leak away to the shorter courses to the fan as soon as the O'Neill entry is reached ; so that, for instance, of the 5,009 cubic feet that start into the O'Neill to travel the works on that and succeeding entries, only 3,465 feet reaches the last break-through on the Lowry entry. Only 3,000 feet travel to the last break-through on the Eastin, and less than 2,000 enter the Holmes and Page entries, where the work is.

## SPECIAL NOTES.

*O'Neill Entry*—8 persons. The air is not carried through the rooms, but allowed to travel the entry exclusively. This must be corrected. The air must be taken through the rooms and kept within 60 feet of the faces. (See Section 11.) The head of the entry is 34 yards beyond the air—42 feet too far. (See Section 11.)

*Lowry Entry*—13 persons. The air must be carried through the rooms, instead of being allowed simply to travel the entry as now.

*Eastin Entry*—10 persons. The air must be carried through the rooms instead of being allowed to simply travel the entry as now.

*Holmes Entry*—More air must be sent to this entry, and it must be kept within 60 feet of the faces of the working places.

*Page Entry*—There are two open break-throughs from Holmes. The rear one should be closed, when work is done beyond it. The air should be carried through the rooms.

I was compelled to defer the examination of the Old O'Neill, John Roll, Old Stinson and Jennings entries—having an aggregate of 17 persons in them.

*Timbering*—About ten additional sets of timbers are needed on the Main, at the bottom and proceeding nearly as far as the door. This should not be delayed. There are a number of dangerous places on that stretch.

An addition of about 8 sets of timbers above, in the vacant space at the side of the shaft, with lagging overhead [is needed.]

*Safety-Catches*—The safety-catches are off the North cage, and yet it is used for hoisting and lowering persons. They should be replaced immediately, and no cage ever used for hoisting or lowering persons when the catches are off.

No. 293.

RUSH No. 6 MINE.

May 9, 1892.

Jacob Schugh, Esq.,

Supt. Mines, Ashland Coal and Iron Railway Co.,

Coalton, Ky.

DEAR SIR: You are hereby respectfully notified that on May 4th and 5th, 1892, the dates of inspection, you were working your mine, the Rush No. 6, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

1. The current intended to ventilate the Simpson, Adams and Fitch & Artist entries (having an aggregate of 118 persons), is inadequate in volume.

2. The current intended to ventilate the Helwich No. 2, Helwich No. 3, Hemmings, Hall, McKnight and Hammond entries (having an aggregate of 70 persons), is inadequate in volume.

3. Provision (such as check curtains) is not made to send the air through some of the rooms.

#### SCHEME OF VENTILATION.

The bank is intended to be ventilated by two distinct currents, the intake for one being the mouth of the Main entry, and that for the other being the mouth of the Water-course. The first mentioned current will be referred to as the Simpson current; the second one, as the Water-course current.

##### 1.

##### *The Simpson Current District.*

The Simpson current passes from the Main into the Simpson, Adams and Fitch & Artist entries, in the order named, and, there being 118 persons engaged on those entries (and their air-courses), it should amount to at least 11,800 cubic feet, but at no point on any of those entries could more than half that amount be found, the best reading, taken in the Fitch & Artist air-course, showing a volume of only 5,611 cubic feet. The best reading that could be obtained on the Main, even—the door beyond the Simpson being opened so as to secure a short route for the air, and the reading being made in the doorway—showed only 10,972 cubic feet of air.

1. *Simpson Entry*—3 persons. This being the course for the entire current, not less than 11,800 cubic feet of air should be entering this entry. But the best reading that could be obtained, after numerous trials, showed only 4,454 cubic feet, and readings taken in the Fitch & Artist air-course showed that there certainly is not more than 4,902 to 5,611 cubic feet of current for this district. Moreover, the current for this entry is very irregular—it comes in gusts.

2. *Adams Entry*—45 persons. There are 68 rooms on this

entry and a like number on its air-course. The first room that connects with the Simpson entry, and through which the ventilating current is expected to come, is No. 28. The first rooms that are working are Nos. 29 and 30; they will be finished in a day or two, and the first room that may be considered as working regularly is No. 33. Beyond that the rooms that are working do not come in regular order, Nos. 39, 40, 42, 43, 50, 51, 52, 53, 54, 55, 56, 57 and 58 being idle. The air is expected to travel through the rooms by break-throughs which have been provided, but in consequence of the absence of curtains at the mouths of some of them it is constantly losing to the entry. This is well shown in the entry just back of room 35, where a measurement showed a volume of 3,590 cubic feet of air on the entry. This was nearly all the air that was coming to the entry. The air should be kept in the working rooms.

The break-through to the air-course, through which the entire current for this district is expected to pass, is just beyond room 68. Three measurements of the air were made there, the highest showing a volume of 3,640 cubic feet, and the lowest a volume of 2,800 cubic feet. There should be not less than 11,800 cubic feet.

The rooms on the air-course will not be properly ventilated—it being necessary for the current to be kept within 60 feet or less of the faces—unless check curtains are provided.

Doubtless some air comes to this entry which is lost to the Fitch & Artist at points back of room 35 (since 5,611 cubic feet of air are found in the air-course of the latter entry); but even were none lost, the current would be too small, since a volume of 5,800 cubic feet is required to satisfy the united demands of Simpson (13 persons) and this entry (45 persons), which is more than could be found on any of the entries.

3. *Fitch & Artist Entry*—about 40 persons. Since this entry gets its air from Adams, and since the demands of that entry and of Simpson more than equal the volume of current flowing, there is no available air left for this entry—measurements at the mouth of the air-course, where all the air must travel, showing only 4,902 to 5,611 cubic feet—and on that ground alone the ventilation must be pronounced insufficient. But in addition are the facts that what air does come to the entry is not properly



carried through the rooms on entry and air-course, and it is lost before the upper rooms are reached, there being scarcely any current passing through the break-through to the air-course, just back of the last room on the entry.

Reference to the probable cause of the inadequacy of the current for this district is made in the Note further on.

*Water-course Current District.*

The Water-course current is expected to pass to the Helwich No. 2, Helwich No. 3, Hemmings, Hall, McKnight and Hammond entries, in the order named, and thence down the Main to the furnace; and, there being 70 persons engaged on those entries, it should amount to at least 7,000 cubic feet. The best measurement that could be obtained, however, which was in the air-course of Helwich No. 2, where the air entering the water-course, together with some leakages from breaks into the Helwich No. 2, was gathered, showed a volume of only 4,160 cubic feet. The volume entering the water-course amounted to only 3,695 cubic feet, and that passing through the regulator on the way to Helwich No. 2 amounted to 3,297 cubic feet. It will be seen, therefore, that the volume of air supplied this district is but little more than half enough.

1. *Helwich No. 2 Entry*—About 50 persons. A volume of not less than 5,000 cubic feet of air is required for this entry alone, but, as just shown, the best measurement that could be obtained indicated a current of only 4,160 cubic feet.

The air is not carried through the rooms either in the air-course or entry, but is allowed to travel the entry and air-course exclusively. This must be remedied by the use of check curtains and the air kept within 60 feet or less of the faces of the rooms. The current can readily be kept passing through the rooms on the air-course, by closing the air-course at a point back of its junction with the Main Entry air-way, and making a break-through from the first room to said air-way, the break-through, of course, being located so as to insure the current being kept near the face of the room.

2. *Helwich No. 3*—4 persons. There are two open break-throughs between the entry and air-course. The rear one should be closed.

3. *Hemmings Entry*—4 persons. The head of the entry is about 125 feet beyond the air. A second break-through is being made at 75 feet beyond the present open one. It is in about four feet. Break-throughs should be made every 60 feet (see Section 11); under this rule, there should be another break-through at the head of the entry, it being necessary to bring the air-course up, if behind, before driving the entry ahead.

4. *Hall Entry*—4 persons. There are two open break throughs between the entry and air-course, and the face of the entry is far enough ahead for another break-through. The rear break-through should be closed, and another one should be made at the head of the entry.

5. *McKnight Entry*—4 persons. There are two open break-throughs between the entry and the air-course, and the face of the entry is about 75 feet beyond the last break-through. I note that a break-through is nearly through at the head.

6. *Hammond Entry*—4 persons. There are three open break-throughs between the entry and the air-course. The two rear ones should be closed. The face of the entry is far enough ahead for another break-through, which, I note, is being made.

*At the Furnace*—On the first day of inspection, two readings were taken at the furnace, about three hours apart. The first reading showed a volume of 28,560 cubic feet passing through; the second showed a volume of 31,212 cubic feet—the fire, in the latter case, having been prepared so as to yield better results than at time of first test, and yet, at the time these measurements were made, there was less than 5,000 cubic feet of air in the “Simpson current,” which should have had a volume of not less than 11,800 cubic feet.

On the second day of inspection, three readings were taken at the close of the examination of the bank. One was taken in the Main Entry air-course, where the entire current (both “Simpson” and “Water-course”) should pass, a short distance back of the furnace; another was taken in a break-through from the Main air-course to work on the Collins Entry at a point nearer to the furnace than the first one—and where more of the Main air-course air would travel, all air found in said break-through being additional to that found in the Main air-course; and the third was taken in front of the furnace, at

the bent of timbers set at the beginning of the walled approach to the furnace.

The first reading showed a volume of 15,430 cubic feet—an excess of about 5,660 feet over the aggregate of the highest readings of the “Simpson” and “Water-course” currents, (the sum of those readings being 9,771).

The second reading, taken in the break-through to the work on Collins, showed a volume of 10,424 cubic feet. All this is additional to the first amount measured, and has been of no service except to the Collins Entry.

The accuracy of the first and second readings is proved by the third, which showed the aggregate amount of air passing through the furnace to be 26,316 cubic feet—an excess of only 462 feet over the sum of the first two readings.

And yet, with all this air going through the furnace, only 5,611 cubic feet of air could be found in the Simpson current, (where there should be 11,850), and only 4,160 cubic feet in the Water-course current, where there should be 9,000.

*Note.*—As a result of the first day's examination, Mr. Wm. Schugh, Bank Boss, made an investigation, and discovered leakages to the Collins Entry from surface-breaks where pillars and stumps had been drawn. The amount of these leakages is shown in the second measurement just given, namely: 10,424 cubic feet; and this seems to be the cause of the inadequacy of the two currents.

I note the reception of your letter of the 6th(?) instant, in which you speak of the breaks in question, and in which you say you have commenced to shut off the leakages and “expect to have it done by to-morrow.” I believe that when those leakages are stopped each current will be sufficient in volume. It will be necessary, however, to see that the air travels through the rooms, as indicated in this Notice.

No. 294.

## STAR FURNACE MINE.

May 7, 1892.

J. W. Hughes, Esq.,

Superintendent Mines Star Furnace Mine,

Kilgore, Ky.

DEAR SIR: You are hereby respectfully notified that on May 4, 1892, the date of inspection, you were working your mine, the Star Furnace, in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

1. You are depending solely on "natural means" for ventilation, notwithstanding that notice was given you June 22, 1891, to adopt artificial means as required by law. You are, therefore, liable to indictment for failure to comply with said Notice (No. 231), and the matter will be placed in the proper hands. To make the matter worse, shot-firing is done at any time, whenever a hole is ready. I refer especially to the New Side workings, where 24 persons are engaged, and where artificial ventilation could have been (and can now be) easily and cheaply secured. It would seem as if the requirement of the law, as brought to your attention in Notice No. 231, had been deliberately ignored. It is estimated that you yet have four or five months of work in the New Side, and I understand that there will soon be a larger force in the Old Side than there is now, there now being only six persons in that side.

No. 295.

## LOST CREEK MINE.

May 9, 1892.

Captain George Gibbs,

Supt. of Mines, Eastern Ky. Railway Co.,

Greenup, Ky.

DEAR SIR: You are hereby respectfully notified that on May 6, 1892, the date of inspection, you were working your mine,

the "Lost Creek," in violation of Section 11 of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

1. The volume of air sent through the bank is inadequate for the number of persons employed, and in some parts is inconstant in direction—flowing first one way and then another.

2. The air is not (by means of check curtains) sent through the rooms, but is allowed to simply travel the entries.

#### DETAILS.

*The Furnace.*—When the furnace was examined the first time there was hardly any fire in it, and a volume of only 2,280 cubic feet of air was passing through. Upon a second examination, after the fire had been built up and was burning well, the volume of air passing amounted to 3,125 cubic feet. But in both instances a considerable proportion of the air passing came directly to the furnace from the outside, through a door at the outer mouth of the Buzzard Roost entry, near by—the door being full of large cracks. The stack (or chimney) of the furnace (which itself is small) being only 2 feet x 2 feet in diameter, will permit only a small amount of air to pass through it; and, the stack also being quite short, the column of heated air is too short to give the motive column required for the obtention of any considerable volume of air. The stack should be large and high.

*The Main Entry.*—There should be a floor on the Main entry, outside the Buzzard's Roost entry, to cause the air to flow without baffling from the Fannin entry to the Hunter, and thence to the furnace. The door might be placed at the mouth of the Main.

*Hunter Entry.*—With 30 persons in bank there should be not less than 3,000 cubic feet of air flowing from this entry towards the furnace, since, with the ventilating current flowing in the proper direction, this entry is on the course along which the entire volume of air should pass, but measurements showed a volume of only 1,449 to 1,656 cubic feet to be passing here.

The air is not carried through the rooms, but is allowed simply to travel the entry. This should be remedied by check

curtains, so that the air shall pass through the rooms and ventilate them as contemplated by the law. The face of no room should be advanced more than 60 feet beyond the air.

*Fannin Entry*—19 persons. This entry, near the head, has an opening to "day" which serves for drainage and as an intake for air. As a consequence, with a furnace of such limited power as the present one, while there is no door on the Main the current on this entry is inconstant in direction, at one time flowing towards the furnace, and at another flowing up the entry and out at the drain just mentioned; depending upon the atmospheric conditions outside, and the movements of the bank-cars in the Main and in this entry. At the time I was at the head of the entry the air was flowing towards and out of the drain. This should be remedied so as to cause the air to flow in one constant direction. Three observations as to volume of air flowing were made. The first showed 2,002 cubic feet of air passing towards the drain. Upon the second no reading could be obtained—the air was practically at a stand-still. A third reading showed a volume of 1,201 cubic feet of air passing.

No provision is made for carrying the air through the rooms, by means of check curtains. This should be remedied and the air sent through the rooms (which are "up 25 to 45 yards") so as to keep the current within 60 feet or less of the faces, instead of simply along the entry.

No. 296.

CENTRAL MINE.

May 19, 1892.

T. C. duPont, Esq.,

Superintendent Central Coal and Iron Co.,

Central City, Ky.

DEAR SIR: You are hereby respectfully notified, that on May 13, 1892, an examination was made of your mine, the Central, with respect to the volume of air supplied the workings. The inspection was made at night, and was not satisfactory on account of the fact that the furnace-fire had been "damped," and when shaken up and started again soon burned down because there was no one to keep it supplied with coal while Mr. Stephens.

and myself were traversing the bank ; I shall, therefore, endeavor to examine the bank again at an early day under more favorable circumstances. The results obtained, however, lead me to believe that the height of the stack on the upcast should be increased, since, now that the furnace has to work against a large amount of rubbing surface, the effect of the wind directed into the top of the present comparatively short stack by the neighboring buildings, etc., is sufficient to cause the air to baffle or come in gusts. In other words, the power of the furnace is not sufficient, with the present large area of excavated space, to combat the adverse effect of the wind directed into the top of the stack, and at the same time maintain a steady and adequate current in the bank, and it should be relieved of this extra work by lengthening the upcast ; also, in order to steadily maintain an adequate current, the furnace fire will have to receive more frequent attention than is given it under present arrangements.

No. 297.

CORYDON MINE.

July 1, 1892.

B. M. Powell, Esq.,

Superintendent Corydon Coal Company,

Corydon, Ky.

DEAR SIR : You are hereby respectfully notified that on June 23, 1892, the date of inspection, an examination of your mine, the Corydon, showed it to be in fairly good condition, except as noted below, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

The roof is bad towards the head of the Main entry, and the props should have good caps.

Full sets of timber should be put in where the slips have cut the roof and the slate has fallen. The roof of this mine is so exceedingly treacherous, that no chances should be taken with it.

There was not much of an air-current traversing the bank,

but, as regards only the personal necessities of the few persons at present employed, there was enough. As a precaution against explosive gas, however—which should never be lost sight of—it was inadequate; and I don't think you will ever get sufficient current for that purpose (in warm weather at least) with the present arrangement of the exhaust-steam apparatus. The stack to the air-shaft is full of cracks; it should be made air-tight, so that the ascending heated air-column may not be cooled by the influx of cool air at the side.

No. 298.

STURGIS MINE.

July 1, 1892.

George H. McCartney, Esq.,

Sec. and General Manager Sturgis Coal and Coke Co.,  
Sturgis, Ky.

DEAR SIR: You are hereby respectfully notified that on June 23, 1892, the date of inspection, an examination of your mine, the Sturgis, showed it to be in the condition noted below, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

Persons in bank 19.

Although a volume of 3,525 cubic feet of air was measured at the upcast, a volume of only 1,438 cubic feet is traveling on the South Side, and that does not reach all the working places.

In view of the fact that you are opening a coal that evolves fire-damp, especial care should be taken to have ample ventilation, both as to quantity of air and its distribution, as a precautionary measure. The fact, also, that blasting is done at "any time" necessitates thorough ventilation. Your present means for securing ventilation (exhaust steam) will not prove adequate.

At present there is a constant fog in the entries—especially the side entries—so dense as to be almost impenetrable. This is unhealthful for the miners.

*1st West Entry.*—The head of this entry is more than 75 feet



beyond the course of the air. The air must be brought up to within 60 feet or less of the face before the entry is carried farther.

*2d West Entry.*—There are three rooms beyond the air. The 2d room (being the 3d from the head) should be propped. I observe only one prop in it.

*3d West Entry.*—The face of the 2d room is far enough advanced for another break-through. Passing from the 1st room to the 1st room on the 1st East Entry is a volume of 1,438 cubic feet of air.

*2d East Entry.*—The head of the entry is about 90 feet (30 feet too far) ahead of the air, on account of the mouth of the 3d room being open. The curtain on this entry is badly torn, and allows a large leakage from the Main immediately to the return air-course.

*1st East Entry.*—The head of the entry is entirely too far ahead of the air for work to be carried farther without the ventilation being brought up.

*Timbering.*—The timbering throughout this mine is unusually scanty. The roof of the coal you are working is deceptive. Although, in a freshly opened space, it often has the appearance of perfect security, and timbering seems unnecessary, it soon begins to break; and in your mine, on account of the large amount of water held in the measures above the coal, the tendency of the roof to break is especially strong.

*Second Outlet.*—When 15,000 square yards of area have been excavated you must have a second opening to the mine. At present between one-fourth and one-third of that area has been excavated. See Sections 3, 10 and 11 of the Mining Laws.

No. 299.

WARDLAW MINE.

July 2, 1892.

J. C. Wardlaw, Esq.,

Superintendent Cumberland Coal Company.

Sturgis, Ky.

DEAR SIR: You are hereby respectfully notified that on June 23d, the date of inspection, an examination of your mine, the

"Wardlaw," showed it to be in a satisfactory condition under present circumstances.

Statements herein are framed as if made on the day of inspection.

It is to be noted that at the time of this inspection the only work you are doing under ground consists of driving the slope.

No. 300.

FOUR-FOOT DEKOVEN MINE.

July 2, 1892.

S. P. Sturgis, Esq.,

Secretary Ohio Valley Coal and Mining Company,

DeKoven, Ky.

DEAR SIR: You are hereby respectfully notified that on June 24, 1892, the date of inspection, an examination of your mine, the "Four-foot Bank," or "Morehead Slope," showed it to be in a defective condition with respect to ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

The volume of air supplied the 5th Right and 4th and 5th Left levels, in which a total of about 55 persons are engaged, is inadequate. There should be not less than 5,500 cubic feet traversing the working places, but the highest measurement that could be obtained (being in the return air-course from the 4th Left level) showed a volume of only 3,717 cubic feet.

*Fifth Right Entry*—20 persons. There should be not less than 4,000 cubic feet of air traveling here, since this is the course for the current supplying the 5th Left entry (with 20 persons) to travel. But, as shown further on, there is but little more than half that amount coming. Two of the rooms on this entry are beyond air. The air must be carried through all the working rooms and kept within 60 feet or less of the faces.

*Fifth Left Entry*—20 persons. Only 2,766 cubic feet of air comes up to this entry, whereas there should be not less than 4,000 feet. The head of the entry is 150 feet ahead of the air. I note that another break-through has just been broken through at the head. The back break-through should be closed, and the

air kept within 60 feet or less of the work, not only in the rooms but on the entry. (See Section 11.)

*Fourth Left Entry*—about 15 persons. Room 49 and all work beyond room 48 is beyond the air. The last break-through for air is opposite room 48. At that point a volume of only 2,236 cubic feet of air is traveling, whereas there should be not less than 5,500 cubic feet. In the return air-course from this entry I measured a volume of 3,716 cubic feet—showing that there is considerable loss by leakage to said air-course.

*Note.*—Under the changes that have been made in the method of ventilating this bank, the foregoing entries, were there no obstacles in the way of the air-current and no considerable losses by leakage, ought to be well ventilated. My opinion is that the present trouble is due to clogged-up air-courses. Clean the air-courses and turn the air so that it will travel the rooms, and there should be no difficulty in the way of obtaining plenty of air.

No. 301.

THREE-FOOT DEKOVEN MINE.

July 2, 1892.

S. P. Sturgis, Esq.,

Sec. Ohio Valley Coal and Mining Company,

DeKoven, Ky.

DEAR SIR: You are hereby respectfully notified that on June 24, the date of inspection, an examination of your mine, the "Three-foot Bank," showed it to be in satisfactory condition, with the present number of persons therein.

Statements herein are framed as if made on the day of inspection.

It is understood that only 10 persons are now engaged there—only 6 being in at the time of inspection.

The current was not very strong, but it was fresh and sufficient for the number of persons.

## No. 302.

## No. 9 DeKOVEN SLOPE.

July 2, 1892.

S. P. Sturgis, Esq.,

Sec. Ohio Valley Coal and Mining Co.,

DeKoven, Ky.

DEAR SIR: You are hereby respectfully notified that on June 24, 1892, the date of inspection, an examination of your mine, the No. 9 Slope, showed it to be in satisfactory condition under present circumstances.

## No. 303.

## STRUNK'S LANE MINE.

July 2, 1892.

L. M. Jackson, Esq.,

General Manager Pine Knot Coal Co.,

Strunk's Lane, Ky.

DEAR SIR: You are hereby respectfully notified that on June 28, 1892, the day of inspection, an examination of your mine, the "Strunk's Lane," showed it to be in a defective condition, with respect to ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

With an average of 45 persons in the bank ("70 if all the numbers were in"), the volume of air is inadequate; the best measurement that could anywhere be obtained showed only 2,323 cubic feet (while there should have been nearly 5,000), and in most places the volume was too small to be measured with an anemometer. In most places, especially in Entry No. 1, towards the head, the best that could be said for the air was that there was a current—simply that the air was moving.

Moreover, the provision is not made, even were there a sufficient volume, to send the air into all the working places as required by Section 11. The air is not carried through the rooms on the left in Entry No. 1, nor through those on the right in Entry No. 2. The head of Entry No. 1 being 80 feet ahead of

the air is 20 feet too far beyond it, and the head of Entry No. 2 being 60 feet ahead of the ventilation should have the air brought up to it. The first Cross-Entry has no ventilation.

I note that you have ordered a ten-foot fan, and trust that my next inspection will be more satisfactory.

In accordance with an established rule of this office, a copy of this Notice will be sent your Bank Committee.

No. 304.

ALPINE MINE.

July 2, 1892.

E. A. Foster, Esq.,

Superintendent Richmond Coal Company,  
Alpine, Ky.

DEAR SIR: You are hereby respectfully notified that on June 28, the date of inspection, an examination of your mine, the Alpine, "Old No. 2" Drift, showed the following improvements to be necessary when you resume operations.

I note the fact that you have suspended work in the "New Drift" and are re-opening the "Old No. 2 Drift."

At present there is no way for obtaining ventilation for the latter (Old No. 2) Drift except by natural means, and that only gives air for the Main Entry. When you commence mining, it will be necessary to secure ventilation by a fan or furnace or equivalent artificial means, and the lateral entries and rooms must be given ventilation in accordance with the requirements of Section 11.

Ventilation must be secured in the same manner, and the air distributed to the working places in accordance with the terms of Section 11, in any other drifts in which you may operate.

Please acknowledge receipt of this Notice.

No. 305.

BARREN FORK MINE.

July 4, 1892.

John H. Holland, Esq.,

Supt. Barren Fork Mining and Coal Company,  
Flat Rock, Ky.

DEAR SIR: You are hereby respectfully notified that on June

28th and 29th, 1892, the date of inspection, an examination of your mine, the Barren Fork, showed it to be in fairly good condition, except as noted below.

Statements herein are framed as if made on the day of inspection.

1. The fan is sending a large surplus of air into the mine, but a large proportion of it is soon lost from the ventilating current, the diminution being so considerable when the 3d Gob Entry off of No. 7 Entry is reached, that the volume of the current is too small for the purposes of the succeeding entries. This must be due either to losses by leakage, or to the large extent of rubbing surface offered by the old rooms through which the air is carried, the effect of the latter being to "back the air up" (compress it) towards the fan and permit only a small portion to flow onward.

There is a tendency in some parts of the mine to go too far ahead of the air. The latter should be kept within 60 feet or less of the faces of the working-places, both on entries and in rooms.

*Losses from the Current.*—The diminution of the ventilating current is shown by the following measurements :

Volume of air entering from the fan . . . . .	25,284	cubic feet.
“ “ in the air-course leading from the fan, just back of		
Entry A . . . . .	23,919	“ “
“ “ at the last two rooms on right on Entry C. . . . .	4,835	“ “
“ “ issuing from the last room on right on the 3d Gob		
Entry off of C Entry . . . . .	5,953	“ “
“ “ issuing from the last room on right on 2d Gob Entry		
off Entry C. . . . .	5,722	“ “
“ “ in the air-course on Entry 7, running from 3d to 4th		
Gob Entries off Entry 7 . . . . .	3,511	“ “
“ “ in air-course of Entry 7, running from the 4th Gob		
Entry to head of Entry 7 . . . . .	3,139	“ “
“ “ issuing from the last room on the right on Entry 7 . . . . .	3,360	“ “

*Entry B and its Gob Entry*—12 persons. This entry is well supplied with air, the current reaching within 20 or 25 feet of the head.

*Entry C*—10 persons. A measurement in the last break-through between the last two rooms on the right showed a current of 812 feet going into the last room, and one made in the

mouth of the second room from the head—the mouth of said room having no curtain or door—showed a current of 4,023 cubic feet; total volume, 4,835 cubic feet. There is one room on the left above the second room from the head of entry which should have the air turned into it.

*Third Gob Entry off of Entry C*—8 persons. A measurement in the mouth of the last room on the right shows a current of 5,953 cubic feet. Omitting the amount needed for Entry B, which may be properly done, a current of about 1,800 cubic feet is required here. Including Entry B, a volume of 3,000 feet would be required. The amount of air supplied, therefore, is sufficient.

*Second Gob Entry off of Entry C*—8 persons. A measurement in the mouth of the last room on the right showed a volume of 5,722 cubic feet, more than enough for the 26 or 38 persons that, up to and including this entry, have to be supplied.

*Third Gob Entry off of Entry 7*—9 persons. In a break-through between a room off of the 2d Gob off of Entry C and one off of the 2d Gob off of Entry 7, being the proper course for the air to the 3d Gob off of Entry 7, a volume of 9,045 cubic feet of air was measured. This is sufficient to meet the requirements of this and the preceding entries; but when we reach the air-course leading to the 4th Gob off of Entry 7, where there should be a current of not less than 4,000 or 5,000 cubic feet, there being, including the 4th Gob and preceding entries, 40 to 50 persons to be supplied—we find a volume of only 3,511 cubic feet.

*Fourth Gob Entry off of Entry 7*—3 persons. As stated above, whereas there should be not less than 4,000 or 5,000 cubic feet of air entering this entry, to meet the requirements of this and preceding entries alone, there is a volume of only 3,511 cubic feet. And in the air-course leading to the head of Entry 7, where there should be a volume of not less than 5,000 to 6,200 cubic feet, there is a current of only 3,139 cubic feet.

*7th Entry*—12 persons. There should be coming to this entry not less than 6,200 cubic feet of air, since the total volume for the persons employed on this and preceding entries should be flowing here; but a current of only 3,360 cubic feet could be found at the point where the total volume should be passing.

*Note.*—Unquestionably, the large area of rubbing surface which is, I must say, unnecessarily offered to the ventilating current, diminishes the amount of current that flows through the works where needed, and doubtless there are many leakages that reduce it. I understand that it is the intention to reverse the manner of ventilating the bank; this will, doubtless, materially better the ventilation. In the meantime, however, a reduction of the amount of rubbing surface, by cutting off old works, and a careful search for, and stoppage of, leaks is desirable. An additional fact which militates against the power of the fan is, that the mouth of the outlet is an open drift, on the same level as the fan, and subject to the action of the winds. When, therefore, the wind is blowing towards the mouth of the out-let drift it is working directly against the fan. If the fan is to be continued as a blower, it would be well to have a stack at the outlet, so as to obviate the difficulty with the winds.

I may say that your mine is in better condition than I have ever known it before. I hope to get to it oftener than heretofore, having been prevented from visiting you as frequently as I desired by pressure of work in other directions.

No. 306.

PROCTER MINE.

August 22, 1892.

W. T. Lewis, Esq.,

General Manager Procter Coal Company,

Red Ash, Ky.

DEAR SIR: You are hereby respectfully notified that on August 11, 1892, the date of inspection, an examination of the work on "No. 1 South Entry" of Procter Mine, showed it to be in very defective condition, as regards ventilation and drainage, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

The "work" referred to includes the upper part of the "No. 1 South" (so named on your map) and the entries off it, namely: "Jenkins," "Evans," "Vaughn" and "Kinsey."



At no place was the volume of air sufficient ; in many places where needed there was no air traveling, and, although the rooms go usually 200 to 220 feet, there is usually only one line of break-throughs between them, and that is carried (to serve as an "air-course") through the necks of the rooms, at a distance of 20 or 30 feet from the entry. To aggravate such a travesty on "ventilation," blasting is done at "any time," thus keeping the working places filled with the poisonous fumes of burnt powder. I had understood that you had abandoned, or would abandon, the practice of firing at any time. It is at any time prejudicial to the health of the miners, working under a single current ventilating system like yours, and under the conditions now existing at these works it is absolutely destructive of health. See Sections 3 and 11 of Mining Law.

#### I. VOLUME OF AIR.

With 55 persons in bank, there should not be less than 5,500 cubic feet of air traveling through the working-places ; but at only one place could a volume even approaching that be found. The measurements varied as follows :

1. *On the Main Entry*, at the break-through into the parallel air-course on the left, at a point between the "Evans" and "Jenkins" entries, the highest point reached by the current, 3,578 cubic feet. At this point all the air intended for the bank is expected to be passing, and there should be not less than 5,500 cubic feet. There should be not less than 4,800 cubic feet to supply the Evans, Vaughn and Kinsey entries alone.

2. *Entering the "Vaughn" air-course*, from Wiggins's room off the Evans entry, 3,872 cubic feet. Here the total volume is expected to pass, and it should be not less than 5,500 cubic feet. It is but little more than enough for Evans and Vaughn entries, granting that it all travels to the proper places, which, in fact, it does not do. See remarks on Vaughn entry.

3. *In break-through between rooms of Newman and Mallicott* on Vaughn entry, 3,332 cubic feet. This is not constant. At the time of measurement, the conditions were favorable for getting all the air that travels this course. See statement concerning Vaughn entry.

4. *In the break through between the first and second rooms that are working on Kinsey entry (being the 12th and 13th back from the face), 5,409 cubic feet.* We are here getting the benefit of leakages, that are of no service to the work in the upper part of the entry. From this point the air goes direct (so to speak) to the furnace. See statement concerning Kinsey entry.

It will be seen that the volume of air does not come up to the legal requirements under ordinary circumstances, and since firing is done at any time the evil is magnified.

## II. BREAK-THROUGHS.

The law (Section 11) explicitly prohibits the driving of any working place "more than sixty feet in advance of a break-through or air-way." This requirement has practically been ignored at your mine, although your attention has been called to it hitherto. Unless due attention is now paid to it, I shall be under the necessity of referring the matter to the courts. The intent of the law is to have the air-current kept within 60 feet or less of the men at work in the rooms, and at the heads of entries and air courses; yet in this bank there is usually only one break-through between rooms, and that at from 20 to 30 feet from the entry, while the rooms are driven 200 to 220 feet in length.

## III. DISTRIBUTION OF THE AIR, ETC.

1. *Main and Jenkins Entries*—The face of the Main entry is too far beyond the air, and the Jenkins entry (just started) has no ventilation. The "Mose Gatliff room" is also beyond the air. I understand that this room is being driven back, parallel with the Main, to bring up the air; but the work should not have been allowed to get so far beyond the current.

2. *Evans Entry*—18 persons. The ventilating current is supposed to travel up to the head of this entry behind a line of gob packing, and thence down through the rooms which are on the left, the rooms being curtained. There is hardly any current in the space behind the gob, towards the head, although (since it is the way for the total current for the bank to travel) there should be not less than 5,500 cubic feet. The air is expected to turn into Ellington's room and thence pass to David] Davis's;

but in the break-through between the said rooms the current was too feeble to be measured. Break-throughs are not made every sixty feet between the rooms. Turner's and Coles' rooms are examples of this omission. Very little current travels through the line of break-throughs that has been opened across the necks of the rooms, for an air-course, until the room from Wm. Grubbs' room to Wiggins's is reached. Here there is an inconstant current—pretty fair at times for 20 seconds or half a minute, and again hardly perceptible. There is a perceptible current from Wiggins's room to the Main air-course (but too small to be measured by instrument); and in the Vaughn air-course, just beyond where the Wiggins room breaks into it, I measured a volume 3,872 cubic feet; it should have been not less than 5,500.

It will be seen that the work on this entry is not sufficiently ventilated.

3. *Vaughn Entry*—14 persons. The air is expected to pass up this entry, from Paschal's room (which is going towards the Evans), past curtained rooms on the left; then into the last open room, and back down through the rooms. At the time this entry was inspected, the head of the entry was 191 feet ahead of the air, and four rooms were working ahead of the current, the latter turning into the fifth room back from the head (Newman's) in consequence of absence of curtains at the mouths of the Newman, Moran and Shell rooms. On the day following this examination (August 12) Mr. Winn informed me that curtains had been hung at those rooms. This, however, still leaves the work at head of entry about 83 feet ahead of the air. As noted on a preceding page, I could measure only 3,332 cubic feet of air passing from Newman's to Mallicott's room, whereas there should be at least 3,900 cubic feet on account of the work already traversed, and 5,500 cubic feet in order to give the Kinsey entry its due quantum of fresh air. As in the preceding entry, the air, what there is in the regular current, travels through a line of break-throughs only 20 or 30 feet from the entry. There does enter the air-course for this entry, from the Evans, a volume of 3,872 cubic feet of air, but it does not reach the upper rooms. The faces of Paschal's and Ratcliff's rooms are not ventilated.

4. *Kinsey Entry*—16 persons. The head of the entry is 113 feet ahead of the course of the air, and there are three rooms opened on that stretch. (See Section 11.) The current is expected to enter the fourth room from the face, and travel back along a line of break-throughs cutting across the necks of the rooms (20 or 30 feet from the entry), but on account of leakages only a small part of the current reaches said room. Moreover, the break-throughs indicated are, many of them, so clogged with rubbish, that the passage of the air is impeded, and the tendency of the stream to take the "short cut" through the outside rooms to the furnace is increased. In the break-through between the first room (double) that is working and the one above (i. e., between the 13th and 12th rooms from the face), a volume of 5,409 cubic feet of air was passing, but the larger part is due to leakages that are of little service to the work here. Beyond the fourth room from the head of entry, the atmosphere is "thick," smoky and oppressive. Only one line of break-throughs is carried through the rooms—the one just mentioned—although the rule is to drive the rooms 200 feet in length.

The drainage of this entry is bad. The work should, as it can, be kept clearer of water.

*Note.*—The roof of No. 1 South Entry is "bad" and dangerous in many places, especially where it passes through "old works." It demands careful attention at once. (See Section 3.)

I trust you will give this notice prompt attention, and not delay in remedying the evils pointed out. Break-throughs must be made in accordance with the requirements of the law, and the air caused to so travel that it will keep within 60 feet or less of the men at work in rooms and entries. Unless this "direction" is heeded legal steps will be taken as contemplated in Section 3 of the Mining Law.

No. 307.

## PROCTER MINE.

August 22, 1892.

W. T. Lewis, Esq.,

General Manager Procter Coal Company,

Red Ash, Ky.

DEAR SIR: You are hereby respectfully notified that on August 12, 1892, the date of inspection, an examination of the work on No. 1 Main and No. 2 Main Entries, showed it to be in defective condition, as regards ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

Said "work" includes the following entries, divided into Districts in accordance with the scheme of ventilation:

*I. No. 2 Main District*—includes the Jones, Smitty, New Logan, Dog, New and Old 12 and 10 entries, in which work is in progress.

*II. No. 1 Main District*—includes No. 15, No. 21 and the Mallicott entries, in which work is in progress.

## I. NO. 2 MAIN DISTRICT.

Number of persons in this district, . . . . . 55

Volume of air required, in cubic feet . . . . . 5,500

This district is intended to be ventilated by having the air enter "Short Six" entry, thence pass up the Jones, thence to No. 8, thence to Smitty, New Logan, Dog, New 12 and 10, Old 10, and thence to the furnace.

Firing is done at any time, thus rendering a larger volume of air than the legal requirement really necessary, and demanding that the distribution and conduction of the current shall be particularly good. In consequence of present defectiveness of the ventilation, the ill effects of the practice are intensified, and the workings in a number of places are very unhealthful. (See Section 3, Mining Law.)

*1. The Jones Entry*—16 persons. Entering the air-course at the last room on the right, 60 feet back from the head of the

entry, was a volume of 2,671 cubic feet of air, passing thence towards No. 8 entry. This does not represent the full volume that enters the bank, as there are numerous chances for leakage to the air-course at points towards the mouth of the entry. In the present state of the work here, the ventilation is sufficient. But there are rooms on the left (4 at this time) into which the air must be turned when they reach the 60-foot limit, and the rooms on the right must also be ventilated according to requirement of Section 11, as the faces are advanced. There is much water in the air-course by and back of the last room, which should be kept cleared away, as it interferes with the men working there.

2. *No. 8 Entry*—No work is now in progress here.

3. *Smitty Entry*—9 persons. A volume of 5,569 cubic feet of air enters the entry from the air-course of the No. 2 Main. It passes into the first room on the left, and thence across the entry, directly to the first room on the right and out that, by a break-through near the face into the air-course of No. 2 Main again. All the work beyond the first room on the right is thus left without ventilation, and consists (directly on the entry) of a third right and third left room and work at the head of the entry. A fourth room on the left was to be opened on the day following this inspection. The second room on the right is turned from the air-course, and although there is a break-through connecting it with the first, near the face, it is not properly ventilated since the air is not conducted to it, but is allowed to pass directly to the 2d Main air-course from the first room. I note that a break-through is being made between said second room and the third—lacks about 12 feet of being through. When this is through, a curtain or stopping should be placed on the air-course between the second and first rooms, the mouth of the first one curtained, and the air sent into third room and through the upper break-through of the second; thus:

(A diagram was given here.)

Red arrows indicate the course of the current at present. It will be observed that the head of the entry, even when the air is brought up to third room, will be 10 feet beyond the limit allowed for it to be in advance of the air. This must not be

allowed to increase. The air must be kept within 60 feet or less of the face of the work. The first and second rooms on the left are both up 60 feet. There is no break-through between them. They are idle now. Should they be worked, the air must be conducted through them according to Section 11.

4. *New Logan Entry*—8 persons. Plenty of air enters the first room of this entry for all needs, but it passes out the mouth of the second room, and leaves the third room and head of the entry without ventilation. The head of the entry is 100 feet beyond the air, and the atmosphere is stifling for some time after a "shot," and loaded with poisonous gases, (and yet the men are expected to continue work there), and it is never fresh and healthful. Happening there shortly after a "shot" had been fired, I found the men working in an atmosphere so thick with powder and lamp-smoke that it was difficult to distinguish objects close at hand.

5. *Dog Entry*—2 persons. Supposed to be aired by current from preceding. The work here is beyond the air, since the current (part of it) comes down the first room from the Logan, and no provision is made for sending it to the third room, in which the work now is. This must be remedied.

6. *New 10 and 12 Entries*—14 persons. The work on these entries is now altogether on pillars. The air is so scattered, no effort having, it would seem, been made to conduct it systematically, that no measurement could be made. No change, apparently, has been made in regard to sending the air through the working places since Notice 283 (March 24, 1892,) was served on you; which see. You were given a similar Notice in regard to these entries in Notice 266, but all directions seem to have been ignored. You are subject to indictment on this matter, and were it not that the work is now on pillars only, the proper steps in that direction would at once be taken. The trouble is and has been more with the No. 10 (now converted into an "air-course") than with No. 12.

7. *Old No. 10 Entry*—6 persons. Work here is also altogether on pillars. The same criticism is to be made as has just been made with reference to New Nos. 12 and 10.

*Note.* These entries, Old and New 10 and 12, have been very badly managed with reference to ventilation—when just the con-

trary course could very readily have been followed—and now that pillar-work has commenced, every thing is at odds. I trust that the experience here, even though it may have been based on the getting of “cheap coal,” will not be repeated in opening other new ground.

## II. No. 1 MAIN DISTRICT.

Number of persons in this district. . . . .	30
Volume of air required, in cubic feet . . . . .	3,000

This District is intended to be aired by having the current enter No. 1 Main, thence into No. 13, which has been converted into an air-course for No. 15; thence to No. 21; thence to Mallicott's (off Old No. 12, which is now an air-course), and thence to the furnace, before reaching which it unites with the current from No. 2 Main District.

1. *No. 15 Entry*—12 persons. Three rooms are working on the right and three on the left. Sufficient air is entering for the work here, but it is not carried to working places as required by law. On the right there is but one break-through between the first and second working rooms (all being towards the head of the entry)—the one, namely, that cuts through the necks of the rooms—and although there is a second break-through between the second and third rooms, only a short distance from the faces, the air does not travel it because the first one is not closed. This second break-through is 80 feet from the first one, instead of only 60, as the law requires. In consequence of the break-through between the first and second rooms mentioned being nearly closed with debris and slack, it is impossible for much air to come to these places. The rooms on the left are without ventilation, no provision being made to send the air into them.

2. *No. 21 Entry*—8 persons. The places working here are without ventilation. Although this is a rough piece of ground, I must strongly insist on giving it proper ventilation. It can readily be done. If the coal here is not worth the expense necessary to give the diggers wholesome air, then it is not worth the getting. The roof of this entry needs vigilant watching.

3. *Mallicott Entry*—10 persons. Although, at the point



where the entry starts from Old No. 12 I measured a volume of 4,514 cubic feet of air, there is practically no ventilation where work is in progress. The air is lost by leakage before it reaches the diggers.

*Note.*—Remarks concerning break-throughs in Notice No. 306 are referred to and made part of this one.

No. 308.

CENTRAL JELICO MINE.

August 23, 1892.

J. P. Mahan, Esq.,

President Central Jellico Coal Company,

Pleasant View, Ky.

DEAR SIR: You are hereby respectfully notified that on August 13, 1892, the date of inspection, an examination of your mines, the Central Jellico, showed them to be in defective condition, as noted herein, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

Reference is particularly made to ventilation, especially in "Bird's Bank," and "A and B Bank," and to the condition of the roof in some of the works.

1. *Cox and Creiger's Room*—3 persons. This is the room now working outside and near to the South entrance of No. 2 or "Cripple Creek" entry. Posts are not kept near enough to the face, the room being 40 feet wide, and the measures above the coal full of water, which tends to break down an already treacherous roof.

*Note.*—On account of there being a treacherous "draw-slate," from 6 to 12 inches thick, between the coal and sandstone at these mines, especial vigilance should be maintained with reference to the roof. The slate should be taken down wherever feasible, and all working places should be thoroughly well propped. These precautionary measures have not been observed at a number of places. Unless properly attended to, the accident list at these mines is likely to be relatively large.

2. "*Cripple Creek*," or *No. 2 Entry*.—The work here is all

on pillars, and I was informed by Mr. Brown that it will be vacated, with the exception of 4 men, after the week of August 15th. Under these circumstances, I refrain from commenting upon it.

3. *B 2 Entry*—5 persons. The roof is dangerous in both rooms that are opened, and it is also dangerous in the entry, towards the head. Warning given in preceding Note is especially applicable to this entry.

4. *Ellett's Entry*—7 persons. There are four rooms on this entry. Warning given in preceding Note concerning "draw-slate" is especially applicable to this entry. It was in a room in this entry, (the first right), that John Bird was injured. Had the draw-slate been taken down the accident would have been averted. I doubt the wisdom of driving rooms so near the "crop," as the 1st Right and 1st Left in this entry are.

5. *Bird's Bank*—18 persons. The air is not sent through the rooms so as to keep within 60 feet or less of the faces (see Section 11, Mining Law), but is allowed to simply travel the entry and the air-course. Hence the rooms on right and left are not properly ventilated. Just back of the last room-neck on the right is a break-through from the air-course to the entry, which leaves the last room and the work at the head of entry too far ahead of the air. *The air must be sent through all the working rooms so as to keep within 60 feet or less of the faces.* The "furnace," so-called, is of little force. It consists simply of a fire built on the floor, the upcast being a loose wooden stack about thirty feet high.

6. "*A*" and "*B*" *Entries*—26 persons. At this bank, "*A*" entry serves as the intake, and "*B*" as the return course for the air. The air is not carried through the rooms so as to keep within sixty feet or less of the faces. This must be done. This applies to "*B*" and "*A 2*" entries, there being no rooms on "*A*" Straight, since it has been turned into an air-course for "*B*." The "furnace" for this bank is like that for Bird's; that is to say, it is not a furnace, but simply an open fire built on the floor, and it is of little force.

*Note 2.*—A comparison of your last map with observations made August 13th, reveals the fact that it would give an erro-

neous impression as to the ventilation of these mines. The arrows, purporting to indicate the course of the air, are delusive. They show only how the air *should*, not how it really *does*, go.

No. 309.

LILY MINES.

August 24, 1892.

H. Davies, Esq.,

Gen'l Manager Lily Mining and Manufacturing Co.,

Lily, Ky.

DEAR SIR: You are hereby respectfully notified that on August 15, 1892, the date of inspection, an examination of your mine, the No. 1 Lily (the "Old Bank"), showed it to be in a defective condition as regards ventilation and drainage, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

I. The volume of air traversing the bank is not sufficient for the number of persons employed, and the current does not travel where most needed.

II. The drainage generally is defective.

I. VENTILATION.

The air enters No. 5 Entry and is expected to pass thence to the work on the following entries, in the order named:

1. *Harkness Entry*.—No work here at present, the entry serving simply as a haulage and air-way.

2. *Gullett Entry*—7 persons. In the break-through between entry and air-course, at 60 feet back from the head, a current of air is passing, but it was too small to be measured. Since this is the course for the total current for the bank, there should be (with 34 persons in) not less than 3,400 cubic feet passing.

3. *No. 5 Entry*—16 persons. At a point a short distance back of the crossing of No. 1 Entry, I measured a volume of 3,258 cubic feet of air, but the larger part of this seems to waste towards the Murphy Entry and pass to the furnace without serving any

good purpose. Beyond the door on this entry, a short distance beyond the mouth of the Harkness air-course, the current was found to be very inconstant. It comes in waves. At times it will have a velocity of 30 feet; again 54 feet; and again it will be at a standstill. When flowing at all, in measurable volume, the quantity varied from 1,077 to 1,939 cubic feet. It is here that we should find the quantity serving for all the entries working, and it is clear that, with such conditions here, the working places beyond are not sufficiently ventilated; subsequent observations verified this conclusion. All the work on this entry is beyond the point at which the attempts at measurements just mentioned were made.

4. *Kinsey Entry*—8 persons. The air for this entry must come from the upper part of No. 5. The entry is without adequate ventilation.

5. *Murphy Entry*—No work here. Entry serves as the return to the furnace. A volume of only 2,271 cubic feet was traveling. The entry is badly clogged by falls.

*At the Furnace.*—Notwithstanding that a “roaring big” fire was burning, I could measure a volume of only 9,396 cubic feet at the furnace. This is largely waste air, that does not even reach No. 1 Cross Entry, as shown by measurement in No. 5, just back of said entry.

## II. DRAINAGE.

It is hardly necessary to specify the defects of drainage. As is well known to you and every one acquainted with the mine, there is a great deal of water in all the entries working, except the Gullett, and it has, under the temporizing methods hitherto followed, been one of the most serious drawbacks to the successful working of this bank.

## III. BAD ROOF.

*No. 5 Entry.*—The roof is dangerous in several places, to which the attention of Mr. Wm. Stott, Bank Boss, was verbally called. Cross-timbers are particularly needed towards the head, and near the mouth of the Harkness Entry.

*Gullett Entry.*—Mr. Stott's attention was also directed to several places on this entry where the roof needs cross-timbering.

*Note.*—I am pleased to note that you are now working out a plan, by sinking a shaft near the present head of No. 5, and placing a pump and ventilating fan there, that should afford ample ventilation, and convert the mine from one of the wettest to one of the dryest in your field. I note your statement of August 17, that the contract for the shaft has been let, and “by first of December, the ventilation and drainage problems of Lily will be solved.” I may say that I have long advocated the drainage of your mine in the manner you now propose. Had it been adopted sooner, some of the disappointments of Lily would have been avoided.

No. 310.

NORTH JELICO MINE.

August 24, 1892.

C. S. Nield, Esq.,

General Manager North Jellico Coal Company,

Grays, Ky.

DEAR SIR: You are hereby respectfully notified that on August 16, the date of inspection, an examination of your mine, the North Jellico, showed it to be in very defective condition, as regards ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

I. The volume of air traversing the bank, with 141 persons in, is altogether inadequate.

II. The air is not forced to travel so as to keep within 60 feet or less of the face of the work, even when the necessary break-throughs are made. Instead, it is allowed to simply travel the entries and the parallel air-courses, the latter being lines of break-throughs cutting across the necks of rooms, at about 21 feet from the entry. Were it not for what aid the machines give in blowing out bad air where working, the atmosphere would, in many places, be intolerably “close;” and it must be remembered that the exhaust from the mining machines does not make a current, which is demanded in order to carry away the foul air.

III. The air-courses are allowed to clog with rubbish, so that even under otherwise favorable circumstances, the ventilation would be impeded.

#### VOLUME OF AIR.

The bank is expected to be ventilated with a single current. There should, therefore, at all points where the total current is intended to pass, be not less than 14,100 cubic feet of air. But not only is there no such volume at any of such points, but even at the furnace, with a large, lively fire, the volume amounts to only 11,713 cubic feet; and it must be borne in mind that a great deal of waste air is gathered at the furnace. Measurements elsewhere, at points where the total volume should pass, gave the following unsatisfactory results:

On the 4th Right Entry, in the air-course, between Rooms 3½ and 4½, 2,925 cubic feet.

On 5th Right Entry, in air-course leading from 4th Right (some leakage gathered here), 3,916 cubic feet.

On the 3d Left Entry, at the mouth of the air-course, entering from the Main Entry, 5,212 cubic feet.

#### DETAILS AS TO ENTRIES.

1. *Third Right*—12 persons. This entry is without even approximately adequate ventilation as regards either volume of air or its distribution through the rooms. On the right a curtain is needed, on Room 19.

There is no provision for sending the air through the rooms on the left—there being only one curtain on the entry, which is placed between Rooms 11½ and 12½. Break-throughs are not made regularly through left-hand rooms; e. g. rooms 16½ and 17½ (up 80 and 75 feet respectively), 14½ (up 108 feet) and 15½, 12½ (up 110 feet) and 13½. In the break-through between 12½ and 11½, where all the air should pass (there being a check-curtain between their mouths), there is not sufficient air traveling to be measured.

2. *Fourth Right*—20 persons. The course for the air is through room 2½ of the Third Right into room 2½ of this entry, and thence into room 3½ and those following. There are two break-throughs between rooms 2½ and 3½, but they are choked

with rubbish, and the current is so feeble that no measurement of it could be made at either opening. In the break-through between  $3\frac{1}{2}$  and  $4\frac{1}{2}$  a volume of 2,925 cubic feet was passing. There should be not less than 14,100 cubic feet, this being a passing point for the total current. A volume of 4,100 cubic feet is required on account of this and preceding entries alone. The face of room  $4\frac{1}{2}$  is 161 feet beyond the air—100 feet too far. The air, in fact, is not forced to take such a course anywhere as will keep it within 60 feet or less of the face of the work. It is simply carried through a line of break-throughs made through the pillars at about 21 feet from the entry, and when additional break-throughs are made (which is occasionally done) they simply let the air diffuse somewhat more freely than would otherwise be the case. Moreover, the air-course is clogged with slate in a number of places, thus greatly interfering with the ventilation. No provision is made to turn the air into and through the rooms on the left, and give them proper ventilation. The head of the entry is 105 feet beyond the course for the air (45 feet too far), and there are rooms on that stretch. It will be seen that the work on this entry is not adequately ventilated. More air is needed, and it must be so conducted as to keep within 60 feet or less of the faces of the work.

3. *Fifth Right*—2 persons. Coming to the first room, by air-course from the Fourth Right entry, is a volume of 3,916 cubic feet of air. There should be 14,100 cubic feet. The head of this entry is 142 feet (82 feet too far) beyond the air, and there are three rooms on the right on that stretch.

4. *Fifth Left*—4 persons. The current is weak, and all work beyond the first room-neck is ahead of the air.

5. *Fourth Left*—No work here at present, and the entry is expected to remain idle for a couple of months yet.

6. *Third Left*—22 persons. Entering the air-course from the Main entry is a volume of 5,212 cubic feet. There should be 14,100 cubic feet. There should be a volume of 6,900 cubic feet on account of this and preceding entries, alone. The air is not forced to keep within 60 feet or less of the faces, but as a rule simply travels the air-course across the necks of the rooms, even when additional break-throughs are made. Moreover, the current grows weaker and weaker towards the head. No provision

is made to force the air to travel through the rooms on the left. The ventilation on this entry is exceedingly defective. The atmosphere is oppressive and smoky.

7. *Second Left*—19 persons. While I was in this entry, the furnace-stack, in consequence of the extraordinary fire that was being kept up and the nearness of the furnace to the shaft, burnt down, and the ventilating current was, therefore, diminished. I could, in consequence, make no trustworthy readings as to quantity of air on this entry; could only examine into the arrangements for distributing the air. But all previous observations show that there is not an adequate quantity of air traversing the bank, and it is not probable that this entry has been receiving its due supply. The atmosphere was thick and smoky in the upper part of the entry, but I can not say whether this is the usual condition, or simply an incident following the burning of the furnace-stack. My notion is, however, that if the ventilation had been good before the stack burnt, it would not have deteriorated so quickly; since, the shaft being 32 feet deep and the fire extraordinarily large, a fair draught should have continued for a considerable time after the accident.

8. *First Left*—28 persons. Could only examine the arrangements for distributing air. The first rooms working are 42 (right) and 44½ (left); the last are 63 (right) and 61½ (left). Since there is no connection between rooms 41 and 42 (right), all the air is forced to pass to the entry, and none of the working rooms on the right receive air. No. 42 is up 175 feet.

9. *First Right of Bowling Entry*—13 persons. Could only examine as to the conduction of air. There are ten rooms on each side. All work on the right beyond room 8½ is ahead of the air, and no provision is made for turning the air into the rooms on the left.

10. *First Left of Bowling Entry*—10 persons. The air is expected to enter the first room on right and follow an air-course across the room-necks, the rooms being curtained. All beyond room 4½ (right) is ahead of the air. There is no break-through between the second room on the left (up 70 feet) and rooms 3 and 1.

*Note.*—I note that it is proposed to put in a second furnace, placing it near the head of the Fifth Right entry. An addi-



tional means for securing ventilation is unquestionably needed, but I would strongly urge, on the score both of efficiency and ultimate economy as well as convenience, that a fan be used instead of a furnace.

No. 311.

DOVEY'S KENTUCKY MINE.

October 5, 1892.

W. H. Dovey, Esq.,

Manager Dovey's Kentucky Mines,

Mercer's Station, Ky.

DEAR SIR: You are hereby respectfully notified that on September 22d, 1892, the date of inspection, an examination of your mine, the Dovey's Kentucky, showed it to be in very defective condition, as regards ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

The timbering, in places, is also in bad condition.

There are 45 persons in bank, 37 of them being in rooms; but there is only 3,458 cubic feet of air entering the air-course leading to portions where the diggers are at work, and very little of that gets to the places where the air is needed.

SCHEME OF VENTILATION.

The supply of air is turned into the Fourth South Entry, and thence into the first room on the left, and is expected to then pass to the air-course of the Fifth South, thence to the work on said air-course, thence to the work on the Sixth South, thence to the work on the Seventh South, thence back to the Sixth South, (via room 12 off the latter,) thence to the Main and the fan. With the present number of persons on those entries, there should be not less than 3,700 cubic feet of air entering the Fourth South. I could measure only 3,458 cubic feet, and, as will be noted in the proper places, all of this does not travel the courses it is expected to follow.

1. *Fifth South Entry*—16 persons. All the work is in rooms on the air-course. The air-course is nearly closed by "falls",

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back of the rooms that are working, and the current is very weak before it reaches even the first room to be served. To state the case briefly, the volume of air is insufficient for the work here, and the larger portion of that which does come, travels up the air-course, instead of through the rooms in the manner required by Section 11 of the Mining Law, 60 feet or less from the faces.

*Sixth South Entry*—12 persons. The air-current should reach this entry by way of an old room at the head of the Fifth South, and enter the entry at a break-through from the air-course at a point between rooms 28 and 29. But only a small quantity travels that way. It travels chiefly through the lower rooms of the Fifth South, and there being an open break-through to the Sixth South back of the one just mentioned, the larger part of the volume passes out at the back break through. Moreover, what air does reach the upper part of this entry, does not travel through the working rooms, there being no check curtains to send it into them; on the contrary, it simply passes down the entry, leaving said rooms inadequately ventilated. The back break-through mentioned above should be closed, and a curtain placed between rooms 28 and 29, and the break-throughs between the rooms made when due, so as to have the air travel properly through the rooms. There should be another break-through between rooms 25 and 24 and between 23 and 22. The face of No. 22 is 45 yards beyond the break-through to No. 21. At this latter break-through the full current for the bank should be passing, but hardly any was observed—the air being, as stated above, nearly all on the entry. As shown by a measurement made below room No. 12, the total volume received for both this entry and the Seventh South amounts to only 1,080 cubic feet. The total volume leaving the entry—measurement being taken to the left of the connection with the fourth room off the Fifth South—to go to the Main and thence to the fan, amounts to only 1,425 cubic feet. There should be not less than 4,500 cubic feet. Rooms 5, 6, 7 and 8 are practically without ventilation.

*Seventh South Entry*—9 persons. There is practically no ventilation for this entry. A slight current issues from room 13, coming from the Sixth South, but is of little service.

## TIMBERING.

There is a tendency not to set sufficient props in the rooms, and not to keep the props close enough to the faces. This was noticed especially in rooms 1, 2, 13 and 16 on the Fifth South, and in rooms 25 and 26 on the Sixth South. On account of the many slips in this coal, the necessity for thoroughly timbering the excavations is greater than otherwise would be the case. The old timbering on the Main entry should be replaced by new. In many places it serves only to hold up loose dirt, and as the cross-timbers are rotten and breaking, the conditions are dangerous.

*Note.*—I note the fact that Mr. Wadely, Bank Boss, has planned to improve the ventilation, one important proposition being to take the air in at the mouth of the Fifth South instead of at the Fourth. This should materially increase the volume, since one of the principal causes of the present deficiency is due to the "falls" which have clogged the air-courses.

No. 312.

## HILLSIDE MINE.

October 5, 1892.

J. W. Lam, Esq.,

President Hillside Coal Company,

Mercer Station, Ky.

DEAR SIR: You are hereby respectfully notified that on September 22, 1892, the date of inspection, an examination of your mine, the Hillside, showed it to be in a satisfactory condition.

Care must be observed to keep the air within sixty feet or less of the faces of the rooms as they are driven up.

I would suggest that hanging the cage by chains, instead of having the entire strain on a cross-bar, as at present, is a desirable improvement.

Please acknowledge receipt of this.

No. 313.

## MEMPHIS MINE.

October 6, 1892.

Capt. J. W. Moores,

Supt. Lessees Memphis Coal and Mining Company,

Bevier, Ky.

DEAR SIR: You are hereby respectfully notified that on Sept. 22, 1892, the date of inspection, an examination of your mine, the Memphis (No. 9), showed it to be in fairly good condition, with exceptions noted below, which are in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

*Third East Entry*—There are five rooms on the left (i. e. between the 3d East and 4th East), near the Cross-entry that leads from the second east to this one, which should be given more air. This may be accomplished by sending a larger split through the curtain that hangs across the entry. A short distance below the Cross that leads towards the Fourth entry (coming from the 23d room off the 2d East) I measured a volume of 6,470 cubic feet of air.

*Fourth East Entry*—27 persons. The 6th, 7th, 8th, 9th and 10th rooms are up about far enough to have break-throughs and the air turned into them.

In the Blind of this Entry I measured 9,527 cubic feet of air. On the Main, just beyond the break-through from room No. 1, of this entry, I found a volume of 10,642 cubic feet.

*Fifth East Entry*—6 persons. The first room is up nearly far enough for a break-through, and the entry is up nearly far enough for a second break-through to its blind.

In the break-through from the Main entry to its blind, I found a volume of 4,782 cubic feet. It is evident that considerable air is losing to the fan. I measured a volume of 16,735 cubic feet on the Main near the in take shaft. The losses, however, do not so far materially affect the ventilation.

*Fifth West*—17 persons. The ventilation is satisfactory, except that on the Blind the third room is up far enough for a break-through from the second; and on the entry proper room

2 is up far enough for a second break-through from the first, and the air should be turned into the third room. Room 4 is up nearly far enough for a break-through from No. 3.

*Fourth West*—7 persons. The ventilation seems to be sufficient for the work here (which is all on the Blind); but on account of the work which is going between this and the Third West, I believe a larger volume should be sent up to the last room on this entry (or rather its Blind) that connects with said work.

*Third West*—27 persons, including those on the "Air-shaft entry." As shown both by my observations and diagrams, checked by your map, there is some confusion in the distribution of the air to the places that are going—between this and the preceding entry—towards the rooms that are coming from the Air-shaft entry. The volume also begins to get short, although the lamp would show a fairly good quantity traveling. Taking into consideration the previous demands on the current, however, (amounting to about 7,500 cubic feet) we find that the volume here is short, and that it will be necessary to send a larger volume up the Fourth West in order to secure for these places their due quota of fresh air.

On the "Air-shaft entry," the air travels through the rooms well enough, but the volume is not large enough (since the total volume for the bank is expected to travel this way,) to give them their due quantum of fresh air. This is shown by a measurement between the two rooms that lead from the Third West (amounting to only 6,222 cubic feet), and by a measurement on this entry a short distance from the break-through into its blind, where the volume amounted to only 4,258 cubic feet, instead of 10,200. Evidently there are leaks to the fan at the expense of this work.

#### WATER.

In regard to the accumulation of water at the heads of the first and second East Entries, I do not believe it should be permitted to increase, so as to reach any higher points on the dams. It would be better were it removed altogether by pumping or other means. On account of the character of the "bottom" there is danger of trouble to the pillars, and the soakage will certainly

be considerable, possibly resulting in trouble to the dip-workings and towards the Third West Entry back of the Cross.

PROPPING.

The work now going on between the Second East and Third East, back of the Cross Entry, is not sufficiently propped. I refer to the block now being wound up, in which William Cush-inberry with others is working.

No. 314.

PIERCE MINE.

October 6, 1892.

Jas. T. Pierce, Esq.,

Lessee Green River Coal and Mining Co.,

Drakesboro, Ky.

DEAR SIR: You are hereby respectfully notified that on September 23, 1892, the date of inspection, an examination of your mine, the Pierce, showed it to be in a defective condition as regards ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

With 38 persons in bank, the volume of air supplied is sufficient, but it is not traveling to the proper places.

*Main West*—11 persons. A split of 3,370 cubic feet of air is supplied this entry, but it does not travel the ten rooms working so as to keep within 60 feet or less of their faces.

*First West Entry*—7 persons. One room is beyond the air. This, I must say, was expected to be remedied on the day following this inspection.

The rear break-through between the First North Blind and the parallel room on the left needs to be closed.

*First North Blind*.—This needs another break-through. It is expected to be completed within two or three days following this inspection.

*First East*—6 persons. In the break-through between the First North and the first room off this entry I found a current of 3,784 cubic feet of air. A second break-through is needed be-

tween the first and second rooms. A break-through from this entry to its blind, just beyond the fourth room now open, should be closed.

*Main East Entry*—10 persons. The current is split up too much as it enters the work on this entry. A larger volume should be sent through the break-through between the third and fourth rooms. Mr. Wright, with whom this was discussed, understands the situation. Moreover, at present the current practically does not travel the rooms at all where the work is, but goes direct to the entry from the room it enters from the first East blind. On this point, however, I may say that there is a possibility that a door between this entry and its blind, nearly opposite said room, was open when I was traversing said rooms; it was found to be open later on. If the door was open, the air certainly would go direct to it, instead of traversing the rooms. It is clear, however, that provision should be made to prevent loss of the air, as indicated above, whatever may have been the immediate cause of the deficiency when this inspection was made.

No. 315.

ABERDEEN MINE.

October 7, 1892.

J. D. Render, Esq.,

President Aberdeen Coal and Mining Company,

Morgantown, Ky.

DEAR SIR: You are hereby respectfully notified that on Sept. 21, 1892, the date of inspection, an examination of your mine, the Aberdeen, showed it to be in fairly good condition, with exceptions noted herein.

With about 34 persons in bank, the supply of air is sufficient, and as a rule it is well distributed.

On the First Left Entry the air needs to be carried nearer to the face, and a somewhat stronger current (now weakened by leakages) would probably be desirable.

I fear that the strong rock roof has been misleading as to the necessity of propping. The rooms are wide, the pillars only 7 to 8 feet thick, and the props, especially in the older rooms, scanty—in some rooms hardly any. The danger is, therefore,

that when the roof settles, it will not break, and thus relieve the pressure, but will crush the pillars, and that when this is once started it will ride over the pillars and do much damage. On this account, therefore, it is not wise to take chances with the roof; care should be taken to have the working places well propped. There is especial danger, in such a case as this, when the work of drawing pillars is commenced.

No. 316.

MUD RIVER MINE.

October 7, 1892.

W. G. S. Anderson, Esq.,

Supt. Mud River Coal, Coke and Iron Co.,

Mud River, Ky.

DEAR SIR: You are hereby respectfully notified that on September 26, 1892, the date of inspection, an examination of your mine, the Mud River, showed it to be in the condition noted below, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

I am pleased to be able to state that your mine is in better condition than I have at any time heretofore known it to be.

There are some defects in the ventilating arrangements, however, which need to be remedied.

With 75 persons in bank, there is an ample volume of air going to the entries on both sides of the slope, and each entry receives an adequate quantity of air. But the current is not so directed as to pass through all the working rooms that have reached, or passed, the 60-foot limit and travel within 60 feet or less of their faces. This is an important omission. It may readily be remedied by the use of a few check-curtains, and the closing of a few rear break-throughs. The tendency now is for all the air to travel almost exclusively on the entries.

#### VOLUME OF AIR.

Measurements made near the junction of the Hartley and Slope Entries gave the following results:

Entering the Hartley Entry, in cubic feet . . . . .	10,532
Traveling up the Slope, for North Side, in cubic feet . . . .	15,343
Total . . . . .	<u>25,875</u>



Since nearly all the miners are now on the North Side, it may be well to reduce the amount of air that goes to the Hartley entry (until the proposed transfer of miners is made to the Dip workings), so as to let a larger volume go to the North side; this on account of the old works that are on the North side.

1. *Blades Entry*.—Five of the rooms have reached the 60-foot limit, and should have the air sent through them. The rear break-through to the blind, now open, should be closed.

2. *Russell Entry*.—A check-curtain should be hung between the 5th and 6th rooms, the air turned into the 5th, then by break-through into No. 6, and thence through the succeeding rooms so as to keep within 60 feet or less of their faces. This may require an occasional curtain at the mouths of the rooms, or a second curtain on the entry between the last two rooms that have reached the 60-foot limit. But whatever provision may be necessary, the point is to have the current traveling within 60 feet or less of the faces, and Mr. Russell will understand how that is to be accomplished in each case. (See Section 11 and Section 3 of Mining Law.) The rear open break through to the blind must be closed.

3. *Main Entry off the Hume*.—The air travels the entry instead of the rooms.

4. *Arnold Entry*.—There was no work at this entry at the time of inspection, but there are thirteen rooms on it, and it is expected to be working soon. Measures must be taken to have the air travel the rooms, as in other cases, when work is commenced.

No. 317.

POWDERLY MINE.

October 7, 1892.

T. Y. Foster, Esq.,

Sec. Greenville Co operative Mining and M'f'g Co.,

Powderly, Ky.

DEAR SIR: You are hereby respectfully notified that on September 27, 1892, the date of inspection, an examination of your mine, the Powderly, showed it to be in a satisfactory condition, except as noted below.

*Second North Entry*.—A curtain should be hung on entry

so as to cause the air to travel through all the rooms that are up 60 feet or more, and keep within 60 feet or less of the faces.

*First North Entry.*—The curtain now between rooms 18 and 19 should probably be moved and hung between 20 and 21 or another one hung there), so as to bring the air through 21.

*Cages.*—Since the men now enter and leave the mine by means of the cages, the latter must be furnished with safety-catches. The requirement in regard to safety-catches has not heretofore been enforced at your mine because of a distinct understanding (evidenced by past correspondence) that the miners would not use the cages—that they would not be permitted to do so; but that they would travel in and out the drift or “drainage entry,” instead. See Sections 11 and 3 of Mining Law.

No. 318.

TAYLOR MINE.

October 24, 1892.

J. P. Barnard, Esq.,

Superintendent Taylor Coal Company,

Louisville, Ky.

DEAR SIR: You are hereby respectfully notified that on September 28, 1892, the date of inspection, an examination of your mine, the Taylor, near Beaver Dam, showed it to be in a defective condition, as regards ventilation, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

With 126 persons in bank, sufficient air enters the mine, but the quantity which travels to the working-places is altogether inadequate, except in the case of the Fifth South Entry.

In the Main Entry just back of the Fifth South entry, a volume of 13,468 cubic feet of air was measured. This is split at the Fifth South, one part going up that entry to supply the work hereon, and other split going into the first room on the left of said entry, to pass to the Sixth South air-course and entry, and hence to the Fifth and Fourth North entries in the order named. Since there are 113 persons to be supplied by the latter split, the volume passing into the room indicated should not be less

than 11,300 cubic feet. Measurements, however, show that the entire volume entering the Fifth South, before the split is made, amounts to only 8,426 cubic feet (to supply 126 persons); and that when the split is made, 3,266 cubic feet pass up the Fifth South (being ample for the 13 persons on that entry), leaving only 5,160 cubic feet to pass into the room mentioned, which is not half enough. Moreover, as the measurements following show, less than half of this volume of 5,160 cubic feet travels to the proper points, the current being much too short even by the time it enters the Sixth South entry, thus:

*Sixth South Entry and Blind.*—There are 15 persons on the Blind and 22 on the entry; total 37. There should, therefore, be not less than 3,700 cubic feet traveling for these entries alone, but a measurement in the air-course (or "blind") just back of the break-through into the entry shows only 2,006 cubic feet. As this is the proper passing point for the entire volume for these and the succeeding North entries (with a total of 113 persons), there should, in fact, be not less than 11,300 cubic feet of air here.

*Fifth North Entry and Blind.*—There are 17 persons on the entry and 9 on the Blind; total 26. A measurement in the Blind shows a current of only 1,683 cubic feet (but little more than half enough for these entries alone), whereas there should be not less than 6,300 cubic feet on these and the preceding entries, and, since this is the passing point for the total current intended for all the works other than those on the Fifth South, the volume should in fact be not less than 11,300 cubic feet.

*Fourth North and Blind.*—There are 27 persons on the entry and 22 on the blind, total 49. A measurement in the blind, a short distance above the turn to the furnace, showed a current of only 7,094 cubic feet, whereas there should be not less than 11,300 cubic feet—this being the proper passing point for the entire current for these and preceding entries.

It is manifest that although sufficient air enters the bank, the ventilation is in fact deficient in consequence of the failure to conduct the current in sufficient volume to the proper places. This should be remedied in accordance with suggestions furnished by the data given above.

No. 319.

## RENDER MINE.

October 8, 1892.

T. C. duPont, Esq.,

Superintendent Central Coal and Iron Company,  
Central City, Ky.

DEAR SIR: You are hereby respectfully notified that on September 29, 1892, the date of inspection, an examination of your mine, the Render, at Hamilton, showed it to be in good condition with respect to quantity of air supplied. With 77 persons in bank, the supply of air is ample.

*The South Split*, upon which are 52 persons, amounts to 4,835 cubic feet at the Fourth South intake, and is increased by the water-ditch intake to 9,995 by the time the Main entry is reached on the way to the furnace.

*The North Split*, on which are 22 persons, amounts to 3,291 cubic feet at the Sixth South intake. Leakages increase the volume entering the furnace to 9,507 cubic feet.

In regard to the details of the ventilation (the conduction of the air through the rooms) I am not now prepared to speak, lack of time, wherein to make the necessary examinations, compelling me to defer that question until later in the year.

No. 320.

## WILLIAMS MINE.

October 8, 1892.

Hon. Jesse S. Williams,

President Williams Coal Company,  
McHenry, Ky.

DEAR SIR: You are hereby respectfully notified that on September 29, 1892, the date of inspection, an examination of your mine, the Williams, near McHenry, showed it to be in the condition noted below.

The mine being idle for the day, and comparatively little fire in the fire-basket, it was not possible to determine the quantity of air actually supplied to the works. It is evident, however, that the volume of air secured by the fire-basket under present

conditions is inconsiderable, but it may be sufficient for the number of persons now employed, the workings not being extensive.

A careful inspection of the bank shows that proper provision has been made for conducting the air, except in the case of the First East entry, and the second and third rooms of those that have been broken off the air-course that is on the left of, and parallel with, the Main. It is to be said, however, that work now in progress will shortly remedy those defects.

Care must be taken to have the air traverse the rooms so as to keep within 60 feet or less of the faces as they are driven up.

No. 321.

McHENRY MINE.

October 8, 1892.

W. G. Duncan, Esq.,

President McHenry Coal Company,

McHenry, Ky.

DEAR SIR: You are hereby respectfully notified that on September 29, 1892, the date of inspection, an examination of your mine, the McHenry, showed it to be in the following condition, with respect to the quantity of air supplied the working entries.

Lack of time prevented my making a detailed examination of the bank, to determine how the air was distributed to the rooms, etc. But observations of the volume of current at the principal passing points, and a general look at the works, show the bank to be in much better condition than has been the case for several past inspections; the rooms are curtained better, better provisions have been made for conducting the air, and the ventilation in general is much improved. Not the least commendable improvement is the omission of the foul South split from the general current which supplies the work on the Seventh South.

Measurements at the following specified points show that there is an ample volume of air coming from the North Side, that it reaches the upper parts of the entries, and that there is sufficient for the Seventh South.

## VOLUMES OF AIR.

In old door-way, Kelley's Entry, Cross-cut between Third and Forth North, in cubic feet . . . . .	7,063
From "Duncan's Shaft," in break-through from Second North to room off Third North, in cubic feet . . . . .	5,174
Total . . . . .	<u>12,237</u>
At Brattice, just back of break-through from room No. 24 into No. 25 off of Fourth North, in cubic feet . . . . .	9,240
In Seventh South Entry, just beyond where air turns to go to Fan, in cubic feet . . . . .	17,926

This is not all the air that goes to the fan, since some comes directly through the curtain at the mouth of the entry.

No. 322.

ECHOLS MINE.

October 8, 1892.

W. G. Duncan, Esq.,

President McHenry Coal Company,

McHenry, Ky.

DEAR SIR: You are hereby respectfully notified that on September 29, 1892 (night), the date of inspection, an examination of your mine, the Echols, showed it to be in defective condition, as noted below, in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the day of inspection.

Notwithstanding that there is a volume of from 9,744 to 10,377 cubic feet of air traveling the Main up to the cut-off to the Third East entry, and turning into that entry, the ventilation is altogether inadequate where needed, which is chiefly on the upper part of the Third East, 37 of the 42 persons in bank being on that entry and air-course. A test made in the break-through near the head of the Third East, where the total current should be traveling, failed to discover a current of even 30 feet velocity, which would indicate a volume there of less than 1,000 cubic feet. In the Baker entry, where the total current is expected to pass, I could find only 1,433 cubic feet. The current seems,

most of it, to lose to the Third East air-course, before reaching the working places, and it is not probable that the works on the Third East can be given proper ventilation without considerable expenditures for tight stoppings, etc. In view of that, I am pleased to know that work there will be stopped by the end of October, and a change made in the course of the ventilating current, which, according to the plan laid before me by Mr. Williamson, should insure a good supply of air at the points where it is required.

Much improvement has been made in this mine in the way of timbering and drainage, and the indications are that a continuation of the work now in progress and the developments of the plans detailed to me by Mr. Williamson will result in placing the mine in good condition both as to drainage and ventilation, and for working out the coal on the East.

Your fan would supply more air were it not placed so as to crowd the top of the air-shaft, which is itself too small, and crowded with pipes and ladders.

No. 323.

PROVIDENCE MINE No. 2.

October 8, 1892.

W. L. Barnes, Esq.,

Secretary Providence Coal Company,

Providence, Ky.

DEAR SIR: You are hereby respectfully notified that on September, 30, 1892, the date of inspection, an examination of your mine, the Providence Shaft, "Mine No. 2," showed it to be in satisfactory condition, with exceptions noted below.

With an average of 22 to 25 persons in bank the supply of air is sufficient, and it is properly conducted through the works on the entries working, namely: The 1st, 2d, 3d and 4th right entries.

*On the Fourth Right*, additional props are needed in Tally's and Reece's rooms.

*The Cages.*—The chains attached to the pulley of the safety-catch of the West Cage is loose, and the catch useless. The

chains should be replaced. The cage needs a cover. The catches and their gear of both cages should be cleaned and oiled and put in good working order. They seem to have been neglected.

*The Hoisting Drum.*—There should be a brake on the drum. See Section 11, of Mining Law.

No. 324.

PROVIDENCE MINE No. 1.

October 8, 1892.

W. L. Barnes, Esq.,

Secretary Providence Coal Company,

Providence, Ky.

DEAR SIR: You are hereby respectfully notified that on September 30, 1892, night, the date of inspection, an examination of your mine, the Providence Slope, "Mine No. 1," showed it to be in defective condition, with respect to ventilation in violation of the Mining Law, a copy of which has been furnished you.

Statements herein are framed as if made on the date of inspection.

The volume of air is short before even the works on the Fugate entry and air-course are traversed.

To supply all the entries there was a current of only 2,988 cubic feet, say 3,000. On the Slate Shot and 1st and 2d Cross entries there are 16 persons.

Deducting the volume of air due them from the total current leaves only 1,400 cubic feet for the Fugate Entry and air-course (22 persons), and the air-course of the Straight Entry (12 persons), whereas there should be not less than 3,400 cubic feet for them. It will be seen that the workings on the air-course of the Straight Entry are left completely without their *due quantum* of fresh air.

I note the claim of Mr. Rowland that during the day a stronger current enters the bank, and deem it reasonable, since there is probably then a better fire in the furnace than at the time this inspection was made (at night). But during the day there are other hinderances to the ventilation, such as the baffling of the air by moving cars, the opening of curtains, etc.,



which necessitates a larger volume of current than when all things are still; and the outside temperature is higher during the day, hence I doubt that, on the whole, the ventilation is any better during the day than at the time the inspection was made.

The condition of this bank has been greatly improved, and when the proposed new shaft is sunk on the First Left Cross (now being driven from the Slate Shot Entry), and a good furnace (or, preferably, a fan) put in, I believe the ventilation will be all that is required. In the meantime, however, the volume of air is deficient and should be increased.

I am glad to note that the slope is being retimbered. This should have been done long ago. The attention of your former Bank Boss was called to the matter at the time of my preceding inspection.

No. 325.

MADISONVILLE MINE.

October 8, 1892.

C. E. Morton, Esq.,

Secretary Madisonville Coal Company,

Madisonville, Ky.

DEAR SIR: You are hereby respectfully notified that on October 10, 1892, the date of inspection, an examination of your mine, the Madisonville, showed it to be in a satisfactory condition, with exceptions noted below.

*First East Entry.*—Considerable fire-damp is “making” in room 10. This should be carefully watched, and the room swept by the current as soon as practicable. There are two open break-throughs to the Second East; the rear one should be closed. It would be well to hang a check-curtain in entry between rooms 8 and 9 when the break-through now being made between them is completed.

*Second East Entry.*—Room 5 has fallen at the mouth. It has no break-through to room 4, and room 6 is hardly up the distance at which one from it would be required. (Said distance, wisely adopted at your mine, being 50 feet.) (See remarks on break-throughs following on another page.) Hence

no air traverses the room, and whatever gas is making there is accumulating as in a reservoir. It is proposed to reach this room from room 4. When the work of breaking into the room is undertaken a safety-lamp should be used, and a naked light should not be used in it until the air has swept freely through it. Break-throughs are needed between rooms 4 and 3 and 3 and 2, and provision should be made to direct the air so that it will sweep through them.

*Second West Entry.*—A break-through is needed between rooms 4 and 3 and 7 and 8. When the latter, now under way, is completed, a check-curtain should be hung on entry between 7 and 8, so as to cause the air to travel up towards the faces of all the rooms. When the top break-through between this and the First West entry is completed (now nearly so) the rear one should be closed promptly.

*First West Entry.*—Room 4 is up about far enough for a break-through to be made to room 3. When this is made, a curtain should be hung on the entry between rooms 3 and 4, so as to send the air well up into the rooms. It would probably be well to have another break-through now between rooms 1 and 2, so as to keep the room-faces clear.

*North Side.*—At present this place, part of which is used for a stable, is like a pocket, and fire-damp is constantly transpiring in appreciable quantity at the face. Until provision is made for sending a split of air into it, so as to keep the gas diluted and cleared away, there is danger of some careless person getting burnt by venturing into it with a naked light.

*The Roof.*—No chances should be taken with the roof of this mine. In consequence of "No. 12" coal above, and the working of gas, particular vigilance should be observed with respect to propping. "No. 12," below drainage, not infrequently holds water, and of course tends to settle and press the roof down, even when the rock which usually lies between it and "No. 11" is present, and when the rock is absent (as is not infrequently the case even in this mine), there is sure to be trouble unless the roof is carefully watched and adequately propped. The props are somewhat scant in places. Care should be taken to maintain thick pillars to guard against a crush when the heavy pressure from above is not relieved by falls.

*Break-throughs.*—Since the work is carried on with naked lights, it will be well not to follow a rigid rule as to the *minimum* distances between break-throughs. The matter should be governed by the manifestations of the fire-damp. Where the gas is pronounced, break-throughs should be made often. It will be well to continue to limit the maximum distance to 50 feet.

*The Shaft Bottom.*—Heavier timbers, collars and legs, are needed at the bottom of the shaft. I was under the impression that I had already called attention to this, but an examination of Notice 277 shows that I failed to do so, except verbally to Mr. Trathen.

*The Cages.*—A new spring is needed for the safety-catches on the West Cage. A leaf in the present one is broken. It would be well to overhaul the catches on both cages, to insure their being in good working order.

*Safety-Lamps.*—Care should be taken to have all safety lamps that are used here clean and free from grease when in service; and the gauze should be watched to see that it is not "burnt out," that the interstices of the mesh are not enlarged, and that no wires are broken. The danger attending the misuse of a safety lamp (in a strong current or otherwise) should be impressed upon whoever may have occasion to work with one.

I feel that these suggestions are justified by the fact that, on account of the fire-damp present, this mine will require great care in its development, and I feel it a duty to neglect no precautionary suggestions, even though they may seem trite to those in charge.

No. 326.

October 8, 1892.

REINECKE MINE.

Inkerman Bailey, Esq.,

Secretary Reinecke Coal Company,

Madisonville, Ky.

DEAR SIR: You are hereby respectfully notified that on October 1, 1892, the date of inspection, an examination of your mine, the Reinecke, No. 9, showed it to be in fairly good condition with exceptions noted below.

An ample supply of air is provided for all the entries, but in some instances it is not kept as close to the faces as the law requires.

### VOLUMES OF AIR

The mine is ventilated by five currents, two of which are splits of the current that goes to the fan, and three of them splits of the current that goes to the old fan.

The volumes in cubic feet of the currents supplying the respective entries are as follows :

For First and Second East, 15 persons. . . . .	10,332
For Third and Fourth East, 15 or 20 persons. . . . .	7,802
For First and Second West, 15 or 20 persons. . . . .	8,680
For Third and Fourth West, 15 or 20 persons. . . . .	9,284
For First and Second North (usually 6,000 feet). . . . .	10,340

*First East Entry.*—Another break-through is needed between rooms 14 and 15, and the rear one should be closed. The rooms are pretty far up without additional break-throughs having been made. The requirement in regard to this matter should be strictly observed.

*Second East.*—Additional break-throughs are needed between rooms, and some of the rear ones closed, so as to keep the air within 60 feet or less of the faces.

I was prevented by lack of time from examining the mine in as much detail as is desirable, and on the West and North entries I could only take observations as to the volume of air at the principal passing points. It is expected to give the mine a thorough inspection at an early date.

No. 327.

DIAMOND MINE.

October 8, 1892.

J. B. Atkinson, Esq.,

Vice-President and Treasurer St. Bernard Coal Co.,

Earlington, Ky.

DEAR SIR: You are hereby respectfully notified that on October 1, 1892, the date of inspection, an examination of your mine, the Diamond, showed it to be in good condition, so far as my inspection extended.

I was unable to give the mine a full inspection, my observations being necessarily confined chiefly to noting the volume of the ventilating current at the principal passing points. It is expected to give the mine a thorough inspection later on.

1. "*Iron Road*" *Cross entry*—8 persons. Volume of current 3,348 cubic feet. Ample.

2. *First and Second Cross on Right*—32 persons (including 4 day hands). Volume of current, including that which served the "*Iron Road*," 5,591 cubic feet. Indicates a volume of 4,791 cubic feet available for the work here. Ample.

3. *United Volume of the Two In-takes*.—Measured in the air-course of the First Right Cross, shortly after union, 12,779 cubic feet. Since this includes the air that served the "*Iron Road*" and First and Second Right entries, the volume available for the Second Left Cross and succeeding portions of the bank (50 or 60 persons) amounts to 8,779 cubic feet. Ample.

*At Furnace*.—A volume of 15,482 cubic feet was measured at the furnace, a "pick up" of about 3,000 cubic feet. The furnace is probably equal to "making" about 20,000 cubic feet of current in the present state of the mine.

## XII.

### NOTES ON THE MINES.

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It is, of course, impracticable to state the condition of each mine at the time of preparing this report. When the facilities of the Office are increased sufficiently to provide for more frequent inspections, there will be less reason for such a statement.

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#### *NORTHEASTERN DISTRICT.*

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##### BOYD COUNTY.

[Output in bushels of 80 pounds.]

Output for six months, ending December 31, 1891: Lump, 1,400,405; nut, 334,873; slack, 334,873; run of mines, 125,465. Total, 2,195,616.

Output for six months ending June 30, 1892: Lump, 1,290,398; nut, 215,032; run of mines, 374,313; slack, 215,032. Total, 2,094,775.

Employes for the year ending June 30, 1892: Maximum inside, 380; outside, 45. Total, 425. Average inside, 295; outside, 30. Total, 325.

##### ASHLAND COAL AND IRON RAILWAY COMPANY'S MINES.

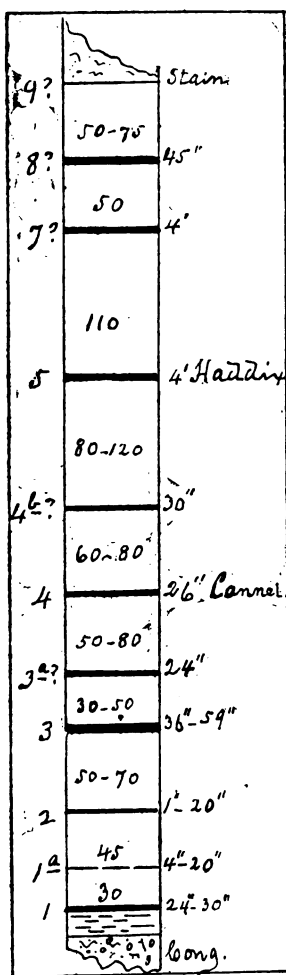
The Ashland Coal and Iron Railway Company has two mines, the *Kilgore No. 5*, at Kilgore Station, and the *Rush No. 6*, at Rush Station. The officers of the company are: Col. Douglas Putnam, Jr., President and General Manager; J. G. Peebles, Vice-President; Robert Peebles, Secretary and Treasurer; E. C. Means, Superintendent; Jacob Schugh, Superintendent of Mines. Head office, Ashland.

The output of the two mines is given above. The Coalton

coal (No. 7) is the bed wrought. Work has not been continuous at Kilgore, the mine there being nearly exhausted. It is expected that practically all the work will soon be centered at Rush, to which place the mine offices have been moved, and where several additional buildings, for offices and dwellings, have been erected during the year. Considerable improvement has been made in the Rush mine. See Inspection Notice 293.

#### BREATHITT COUNTY.

There is but one commercial mine in this county, data concerning which are given below. The coal wrought is No. 3, of



the Eastern Field, known as the "Peach Orchard Seam" in Lawrence county, and as the "Elkhorn Coking Coal" in Pike and adjoining counties. Unfortunately, where opened it is not at its best, as regards either thickness or quality.

The accompanying vertical section, constructed from data given in the report of Mr. P. N. Moore on the "Geology of a Section from Campton, Wolfe County, to the Mouth of Troublesome Creek, Breathitt County," (1875), will aid in prospecting this region.

#### ELKATAWA MINE.

At Elkatawa.

P. O. Jackson.

Operated by Kentucky Union Land Company, E. T. Halsey, Receiver; Receiver's Agent, L. T. Rosengarten; Superintendent, Chas. Hendrie.

Output in bushels of 80 pounds for the six months ending December 31, 1891: Lump, 33,695; nut, 1,050; run of mines, 97,679. Total, 132,424.

Output in bushels for the six months ending June 30, 1892: Lump, 27,385; nut, 675; run of mines, 103,493. Total, 131,553.

Employes for year ending June, 30, 1892: Maximum, inside, 40; outside, 8. Total, 48. Average inside, 32; outside, 7. Total, 39.

No special improvements were made during the year.

#### CARTER COUNTY.

Output in bushels for six months ending December 31, 1891: Lump, 843,212; nut, 227,171; mixed lump and nut, 4,648; run of mines, 748,870; pea, 28,357; slack, 67,155; miscellaneous, 94,956. Total, 2,014,369.

Output in bushels for six months, ending June 30, 1892: Lump, 540,602; nut, 223,375; mixed lump and nut, 169,919; run of mines, 680,598; pea, 33,233; slack, 133,607; miscellaneous, 86,156. Total, 1,867,490.

Employes for the year ending June 30, 1892: Maximum inside, 414; outside, 104. Total, 518. Average, inside, 309; outside, 71. Total 380.

Fatalities inside during year ending June 30, 1892, one.

#### LOST CREEK MINE.

Near Willard.

P. O. Willard.

Operated by the Eastern Kentucky Railway Co.; H. W. Bates, Vice-President and General Manager; Geo. Gibbs, Superintendent.

Output in bushels for six months ending December 31, 1891: Lump, 43,351; nut, 28,433; mixed lump and nut, 500; run of mines, 17,124; pea, 8,312. Total, 97,720.

Output in bushels for six months ending June 30, 1892: Lump, 48,043; nut, 18,487; run of mines, 112,123; pea, 887; slack, 4,525; nut and pea, 16,770. Total, 200,835.

Employes during year ending June 30, 1892: Maximum, inside, 63; outside, 3. Total, 66. Average, inside, 28; outside, 2. Total, 30.

This mine was opened within the year ending June 30, last. Within that time (dating really from August) 500 yards of entry have been driven, a furnace has been built, and other "improvements" made for the proper working of the mine. See Notice 295.



## DRY FORK MINE.

Near Willard.

P. O. Willard.

Operated by the Willard Coal Co., M. J. Dobbins, President ; O. G. Conway, Secretary and Superintendent ; John W. Katchen, Treasurer.

Output in bushels for six months ending December 31, 1891: Lump, 23,223 ; nut, 23,109 ; run of mines, 12,227 ; mixed lump and nut, 2,273 ; slack and pea, 10,000. Total, 70,832.

Output in bushels for six months ending June 30, 1892: Lump, 2,560 ; nut, 3,472 ; run of mines, 36,379. Total, 42,411.

Employees for the year ending June 30, 1892: Maximum, inside, 23 ; outside, 5. Total, 28. Average, inside, 20 ; outside, 5. Total, 25.

This mine has been worked only in a desultory way. It was not in operation when Willard was visited in May, but work has been resumed for winter trade. No improvements have been made during the year.

## STAR FURNACE MINES.

Near Kilgore.

P. O. Kilgore.

Operated by the Norton Iron Works, C. H. Green, President ; T. M. Adams, Vice-President ; E. E. Seaton, Secretary ; John Russell, Treasurer ; J. W. Hughes, Superintendent at mines. Head office, Ashland.

Output in bushels for the six months ending December 31, 1891: Lump, 339,832 ; nut, 61,905 ; slack, 61,905. Total, 463,642.

Output in bushels for six months ending June 30, 1892: Lump, 187,873 ; nut, 36,500 ; run of mines, 12,510 ; slack, 36,750. Total, 273,633.

Employees for year ending June 30, 1892: Maximum, inside, 88 ; outside, 9. Total, 97. Average, inside, 61 ; outside, 7. Total, 68.

These mines are nearly exhausted. There is but little more than stump and pillar work now available. See Notice 294.

## MT. SAVAGE MINE.

Near Mt. Savage.

P. O. Mt. Savage.

Operated by the Lexington and Carter County Mining Co., R. H. Courtney, President and Treasurer; W. W. Estill, Vice-President; F. S. Cully, General Manager at mines. Head office, Lexington.

Output in bushels for six months ending December 31, 1891: Lump, 20,818; nut, 10,505; run of mines, 47,109; slack, 58,660; mixed lump and nut, 168,919. Total, 306,011.

Output in bushels for six months ending June 30, 1892: Lump, 137,146; run of mines, 130,837. Total, 267,983.

Employes for year ending June 30, 1892: Maximum, inside, 59; outside, 29. Total, 88. Average, inside, 46; outside, 10. Total, 56.

No special improvements have been made during the year.

## MUSIC BITUMINOUS MINE.

Near Music.

P. O. Music.

Operated by the Lexington and Carter County Mining Company. (See Mt. Savage.) F. S. Cully, General Manager at mines (his P. O. address, Mt. Savage).

Output in bushels for six months ending December 31, 1891: Lump, 5,531; nut, 2,527; run of mines, 339,140; slack, 5,214. Total, 352,412.

Output for six months ending June 30, 1892: Lump, 29,883; run of mines, 404,310. Total, 434,193.

Employes for year ending June 30, 1892: Maximum, inside, 46; outside, 30. Total, 76. Average, inside, 36; outside, 22. Total, 58.

These mines are rapidly approaching exhaustion. No special improvements were made during the year.

## STINSON CANNEL MINE.

Near Music.

P. O. Music.

Operated by the Lexington and Carter County Mining Co. (See Mt. Savage.) F. S. Cully, General Superintendent. (His P. O. address, Mt. Savage.)

Output for six months ending December 31, 1891, 2,466.75 tons.

Output for six months ending June 30, 1892, 3,537.20 tons.

Employes for the year ending June 30, 1892: Maximum, inside, 65; outside, 37. Total, 102. Average, inside, 37; outside, 26. Total, 63.

No special improvements have been made during the year.

#### WILBURN MINES.

Near Denton.

P. O. Denton.

Operated by the Mary Coal Co., J. D. Hazelrigg, President; W. H. Strossman, Secretary; Wylie Prichard, Superintendent. Head office, Mt. Sterling.

Output in bushels for the six months ending December 31, 1891: Lump, 91,190; nut, 32,338; run of mines, 34,160; slack, 5,250; mixed lump and nut, 1,875; pea, 20,045. Total, 184,858.

Output for the six months ending June 30, 1892: Lump, 76,058; nut, 54,620; run of mines, 6,044; slack, 14,625; pea, 32,346. Total, 183,693.

Employes for the year ending June 30, 1892: Maximum, inside, 65; outside, 15. Total, 80. Average, inside, 50; outside, 12. Total, 62.

No special improvements have been made during the year.

#### STRAIT CREEK MINES.

Near Denton.

P. O. Denton.

Operated by the Strait Creek Coal Co., M. M. Cassidy (President); Wm. Mitchell (Treasurer), and W. T. Tibbs, Directors; Kent Prichard, Superintendent. Head office, Mt. Sterling.

Output in bushels for six months ending December 31, 1891: Lump, 178,587; nut, 81,386; run of mines, 150,212; slack and pea, 84,956. Total, 495,141.

Output in bushels for six months ending June 30, 1892: Lump, 199,719; nut, 97,264; run of mines, 127,293; slack, 13,833; slack and pea, 69,386. Total, 507,495.

Employes for the year ending June 30, 1892: Maximum, in-

side, 76 ; outside, 12. Total, 88. Average, inside, 66 ; outside, 12. Total, 78.

No special improvements were made during the year.

#### LITTLE FORK MINE.

Near Anglin.

P. O. Anglin.

Operated by the Little Fork Coal and Sand Co., J. W. Lyttle, President ; W. A. Newton, Vice-President ; Miss Mamie Lyttle, Secretary and Treasurer ; M. L. Beall, General Superintendent. Principal office, Lexington, Ky.

This is a new mine, at which operations began August 15, 1892. The Company was organized December 18, 1891. From 8 to 10 miners were employed in July last ; the number will doubtless be increased later in the season.

#### GREENUP COUNTY.

The only commercial coal mined in this county is the "Hunnewell" cannel, which is gotten at various points on the property of the Eastern Kentucky Railway Company, about 25 men now being employed in the work. The company does not direct the mining, but receives the coal at its railroad from the diggers, who, in a sense, work on a royalty.

Output of the mines for the six months ending December 31, 1891 (operations extending through only three), 170 short tons.

Output for the six months ending June 30, 1892, 535 tons.

#### JOHNSON COUNTY.

The commercial product of this county consists of cannel only. Seam No. 2 is the one worked.

Output for the six months ending December 31, 1891, 11,494½ short tons.

Output for six months ending June 30, 1892, 13,347.84 short tons.

Employes for the year ending June 30, 1892 : Maximum, inside, 125 ; outside, 28. Total, 153. Average, inside, 125 ; outside, 26. Total, 151.

## SANDY RIVER MINE.

Near Myrtle.

P. O. Myrtle.

Operated by the Sandy River Cannel Coal Co. (Messrs. G. O. Richardson, J. P. Dieter, and T. A. Stacey.) G. R. Bickford, Superintendent at Mines. Head office, Chillicothe, Ohio.

Output for six months ending December 31, 1891, 3,596 short tons.

Output for six months ending June 30, 1892, 3,695.84 short tons.

Employes for the year ending June 30, 1892: Maximum (average the same), inside, 45; outside, 6. Total, 51.

No special improvements were made during the year.

## WHITE HOUSE MINE.

Near Myrtle.

P. O. Myrtle.

Operated by the Whitehouse Cannel Coal Co. M. B. Goble, President; Jay H. Northup, General Superintendent and Treasurer. Lucien S. Johnson, Superintendent at Mines. Head office, Ashland.

Output for six months ending December 31, 1891, 7,898½ short tons.

Output for six months ending June 30, 1892, 9,652 short tons.

Employes for the year ending June 30, 1892: Maximum, inside, 80; outside, 22. Total, 102. Average, inside, 80; outside, 20. Total, 100.

Five small dwelling-houses were built during the year.

## LAWRENCE COUNTY.

During the statistical period covered by this Report, the only commercial mines operated in this county were those of the Great Western Mining and Manufacturing Company. The coal wrought is the No. 3, or "Peach Orchard," seam.

## THE "ELIZABETH" AND "ANNIE" MINES.

At Peach Orchard.

P. O. Peach Orchard.

Operated by the Great Western Mining and Manufacturing

Co., B. D. Harris, President; Geo. S. Richardson, Vice-President; John Carlisle, Secretary and Treasurer; W. S. Howell, General Manager; Conrad Frank, Superintendent of Mines.

Output in bushels for six months ending December 31, 1891: Lump, 794,750; nut, 84,950; run of mines, 8,575; pea, 117,725. Total, 1,006,000.

Output in bushels for six months ending June 30, 1892: Lump, 593,886; nut, 49,900; run of mines, 11,400; slack, 25,000; pea, 94,175; miscellaneous, 28,500. Total, 802,861.

Employes for the year ending June 30, 1892: Maximum, inside, 253; outside, 50. Total, 303. Average, inside, 203; outside, 50. Total, 253.

During the year a new incline and drum-house were built at each of the mines, and a furnace was put in at the Annie mine. Ten new houses were built and eighteen repaired.

#### THE TORCHLIGHT MINES.

At Torchlight Station.

P. O. Ashland.

These are two new mines, one of them in what is deemed the No. 2 bed and the other in the No. 3 or "Peach Orchard" seam, which have been opened by Col. Jay H. Northup, operations being conducted under the name "Torchlight Coal Co." Torchlight Station is on the Ohio and Big Sandy Railroad, six miles south of Louisa. The interval between the two beds amounts to about 100 feet. The lower bed, No. 2, is from 22 to 30 inches thick, of which about one-third is cannel. The upper bed, all bituminous, measures 44 inches in thickness. Col. Northup has kindly furnished the following reports of analyses of the two beds:

	Bituminous.	Cannel.
Moisture . . . . .	4.12	2.20
Volatile combustible matters . . . . .	42.68	53.52
Fixed carbon . . . . .	50.02	40.28
Ash . . . . .	3.18	4.00
	100 00	100 00
Sulphur . . . . .	.880	.754

Col. Northup writes: "The C. & O. Coal Agency took a sample of 10-inch cannel, another vein on the same property, which gave the following wonderful analysis:

Moisture . . . . .	1.62
Volatile combustible matters . . . . .	63.76
Fixed carbon . . . . .	30.81
Ash . . . . .	4.31
	<hr/>
	100.00

It is not stated whether the samples, of which analyses were made, were selected specimens or chippings to show the average quality of the coal.

#### LEE COUNTY.

The coal wrought in this county, which, belonging to the Conglomerate Series, is known in this section as the "Beattyville," or "Main Sub-Conglomerate" coal, has been described in preceding Reports. It is one of the most excellent coals in the Eastern Field. No commercial coal was dug during the statistical period covered by this Report. Operations are awaiting the completion of the railroad (the Winchester and Beattyville) now building from Beattyville to the Kentucky Union Railway.

#### MENEFEE COUNTY.

The coal wrought in this county belongs to the Conglomerate series, and is known as the "Main Sub-Conglomerate" bed.

Output in bushels for six months ending December 31, 1891: 17,500, all mixed lump and nut.

Output in bushels for six months ending June 30, 1892: 30,000, all run of mines.

Employes during the year ending June 30, 1892: Maximum, inside, 23; outside, 13. Total, 36. Average, inside, 15; outside, 9. Total, 24.

There are but two mines—the Hathaway and Indian Creek—from which commercial coal has been dug. The most important one is

#### THE INDIAN CREEK MINE,

Operated by W. T. Dennis, near Rothwell. Mr. Dennis's operations have been materially restricted by the fact that he has been compelled to haul his coal a distance of two miles to the railroad. He expects, with the extension of the road to his mines, to do a larger business hereafter.

*THE SOUTHEASTERN DISTRICT.*

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**BELL COUNTY.**

Operations in this county, during the larger part of the statistical period covered by this Report, have been carried on in a somewhat desultory fashion, in consequence of changes occurring in the controlment of the mines; and the output, which, to be most profitable, must be converted into coke, has been limited by the shutting down of certain Southern furnaces which had been relied upon to consume the coke.

Output in bushels for the six months ending December 31, 1891, all run of mines, 617,175.

Output in bushels for the six months ending June 30, 1892: Lump, 12,793; nut, 1,625; run of mines, 222,036; slack, 10,582. Total, 258,736.

**THE STRAIGHT CREEK MINE.**

Near Pineville.

P. O. Pineville.

During the last half of 1891 this mine was operated by the East Kentucky Coal and Iron Company. During 1892 it has been operated by that company's successor, the Southern Land Improvement Company, J. C. Howard, President; F. F. Reed, Vice-President; J. B. Butin, Secretary; John G. Taylor, Treasurer.

Output in bushels for six months ending December 31, 1891, all run of mines, 454,875.

Output in bushels for the six months ending June 30, 1892, all run of mines, 215,836.

Employes during the year ending June 30, 1892: Maximum, inside, 116; outside, 9. Total, 125. Average, inside, 47; outside, 6. Total, 50.

During the year 50 coke ovens were built, completing the plant of 100 begun by the East Kentucky Coal and Iron Co. An opening was made in the second workable seam, with a view



to developing an additional mine, and an incline from it to the tippie of the present mine was partly graded. The present mine has been opened, so far as regards courses of entries, etc., in very awkward fashion, to say the least. Unless radical changes for the better are made—and it is proper to state that changes for the better *have* been made by the Southern Land Improvement Co.—considerable portions of the mine will be lost. The ventilating and drainage arrangements are poor.\*

#### CUMBERLAND VALLEY COLLIERIES, 1 AND 2.

These collieries have been described in a preceding Report. Colliery No. 1 is near the mouth of Straight creek, near Pineville; No. 2 is on Stewart's branch, at West Pineville. Colliery No. 2 has been idle during the entire statistical period covered by this Report. Colliery No. 1 was worked by the Cumberland Valley Colliery Co. during the last half of 1891, and by A. G. White & Co., lessees under the former company, during the first half of the present year, when, together with No. 2, it passed into the hands of the Breckenridge and Pineville Syndicate, Limited. Mr. Wm. Hopper is the General Manager for the latter company. Address, Room 60, Kentucky National Bank Building, Louisville, Ky.

Output in bushels for six months ending December 31, 1891, all run of mines, 162,300.

Output in bushels for six months ending June 30, 1892: Lump, 12,793; nut, 1,625; run of mines, 6,200; slack, 10,582; "miscellaneous" (probably used for coke), 11,700. Total, 42,900.

There is no report of the number of employes during the last half of 1891. Employes for the six months ending June 30, 1892: Maximum, inside, 51; outside, 7. Total, 58. Average, inside, 9; outside, 4. Total, 13.

#### THE BRECKENRIDGE-PINEVILLE CANNEL MINE.

This is a new mine being opened by the Breckenridge and Pineville Syndicate, Limited, near the Cumberland Valley Colliery No. 2. The bed wrought is that known as the "McGuire

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\*These mines are now in the hands of the Central Appalachian Co., Limited.—  
Nov. 10.

Coal" (see General Section for the Pineville region), which is here a compound bed of bituminous and cannel coal. The mine has not been sufficiently developed, not yet having passed beyond the initiatory stage of what are, in effect, "test drifts," to require description.

#### THE MIDDLESBOROUGH REGION.

The commercial mines of the "Middlesborough Region" are, contrary to the general impression, all in Tennessee, as is the coke plant, and most, if not all, the companies are working under Tennessee charters. The product is handled through the offices located in Middlesborough, and it is possible that the town derives some benefit from the miners' trade in consequence. The future of this immediate region seems to depend largely upon the outcome of the venture of the Watts Iron and Steel Syndicate.

#### CLAY COUNTY.

The only noteworthy mine in this county is that of GEN. T. T. GARRARD, near Manchester, the output of which, amounting to about 60,000 bushels annually, is used at the Salt Works. Usual number of employes inside, 8; outside, 1. The No. 1 coal is wrought.

#### KNOX COUNTY.

There is but one commercial mine operated in this county. It is

##### THE NORTH JELICO MINE.

Near Gray.

P. O. Gray.

Operated by the North Jellico Coal Co., J. B. Speed, President; I. P. Barnard, Vice-President; W. A. Jones, Secretary and Treasurer; C. S. Nield, General Manager. Head office, 415 Jefferson street, Louisville, Ky.

Output in bushels for the six months ending December 31, 1891: Lump, 530,256; nut, 4,638; slack, 65,876; mixed lump and nut, 653,648; pea, 262,137. Total, 1,516,555.

Output in bushels for six months, ending June 30, 1892: Lump, 330,637; slack, 79,388; mixed lump and nut, 418,226; pea, 175,200. Total, 1,003,451.

Employees for the year ending June 30, 1892: Maximum inside, 226; outside, 40. Total, 246. Average, inside, 181; outside, 25. Total 206.

During the year four mining machines were added to the equipment, and twenty dwellings for miners and two for officials were built. This is one of the best equipped mines in the State. The arrangements for handling the product are especially praiseworthy. The ventilation of the mine, however, has been defective from lack of power at the ventilating shaft. See Notice 310.

#### LAUREL COUNTY.

The coal generally wrought in this county is the No. 1 bed, which, from the extent to which is worked here, is known as the "Laurel Seam." Near Livingston, coals belonging to the Conglomerate Series are accessible and have been worked, but the mines are now idle. It may be remarked that the Laurel coal being soft, the rooms in mines opened in it should not be wide, and the necks should be long. Otherwise the pillars can not stand the pressure, and are lost in consequence of the crumbling of the coal when mined.

Output in bushels for six months ending December 31, 1891: Lump, 1,629,407; nut, 542,189; run of mines, 1,132,591; slack, 45,400; mixed lump and nut, 611,596; pea, 48,330. Total, 4,009,513.

Output in bushels for six months ending June 30, 1892: Lump, 958,119; nut, 339,081; run of mines, 703,028; slack, 30,675; mixed lump and nut, 482,163; pea, 28,205; miscellaneous, 86,000. Total, 2,627,271.

Employees for the year ending June 30, 1892: Maximum, inside, 885; outside, 175. Total, 1,060. Average, inside, 665; outside, 123. Total, 788.

#### THE UNION MINE.

Near Pittsburgh.

P. O. Pittsburgh.

Operated by the Union Coal Co., Thompson Jeffrey, President; John Jeffrey, Secretary.

Output in bushels for six months ending December 31, 1891: Lump, 35,688; nut, 9,930; run of mines, 159,682. Total, 205,300.

Output in bushels for six months ending June 30, 1892: Lump, 35,456; nut, 14,092; run of mines, 159,975. Total, 209,523.

Employes for the year ending June 30, 1892: Maximum, inside, 47; outside, 8. Total, 55. Average, inside, 41; outside, 6. Total, 47.

About the only outside improvements made during the year were in connection with the tippie. The interior management has been materially improved over the conditions of former years.

#### LITTON COAL CO.

Near East Bernstadt.

P. O. East Bernstadt.

Operated by the Litton Coal Co., C. Litton, President; W. J. Litton, Secretary.

Output in bushels for six months ending December 31, 1891, all run of mines, 123,992.

Output in bushels for six months ending June 30, 1892, all run of mines, 68,943.

Employes during year ending June 30, 1892: Maximum, inside, 45; outside, 6. Total, 51. Average, inside, 30; outside, 4. Total, 34.

Very little improvement was made at these mines during the year, beyond the building of three small houses. The ventilation of the mines has been poor, due as much to lack of power at the ventilating shaft as to defects in other directions. Connection is being made with the old Black Diamond Mine, which promises to lead to better conditions.

#### "NICKEL PLATE" AND "QUEEN CITY" MINES.

Near East Bernstadt.

P. O. East Bernstadt.

Operated by the Nickel Plate Coal Company, G. D. Brownlie, President; J. M. Thompson, General Manager.

The Queen City mine was not in operation during the first half of the present year.

Output in bushels (both mines) for six months ending December 31, 1891: Lump, 85,900; run of mines, 122,000; mixed lump and nut, 14,500. Total, 222,400.

Output in bushels (Nickel Plate) for six months ending

June 30, 1892: Run of mines, 5,500; block, 42,000; steam, 44,000. Total, 91,500.

Employees during year ending June 30, 1892: Maximum, inside, 100; outside, 20. Total, 120. Average, inside, 60; outside, 10. Total, 110.

During the year a new opening was made, connecting with the old works of the Nickel Plate. The ventilation of these mines has been very poor; inadequate means for producing a current, and defective measures for conducting the air through the workings, have been the causes.

#### STAR MINE.

Near East Bernstadt.

P. O. East Bernstadt.

Operated by the Star Coal Company, J. McNeill, President; R. J. Morris, Secretary and Treasurer; George Harrison, Superintendent.

Output in bushels for six months, ending December 31, 1891: Lump, 120,343; nut, 29,938; run of mines, 9,032. Total, 159,313.

Output for six months ending June 30, 1892: Lump, 97,203; nut, 13,634; run of mines, 862. Total, 111,699.

Employees for the year ending June 30, 1892: Maximum, inside, 32; outside, 9. Total, 41. Average, inside, 27; outside, 7. Total, 34.

During the year a new ventilating shaft was put down, and a new entry has been carried through the hill. The ventilation and general condition of this mine has been materially improved.

#### ÆTNA MINES.

Near Pittsburgh.

P. O. Pittsburgh.

Operated by Capt. W. A. Pugh.

Output in bushels for six months ending December 31, 1891, all run of mines, 137,743.

Output for six months ending June 30, 1892, all run of mines, 87,582.

Employees for the year ending June 30, 1892: Maximum, inside, 25; outside, 6. Total, 31. Average, inside, 15; outside, 3. Total, 18.

These mines are now but little more than "scrapping

ground ;” they consist of several distinct drifts or banks, and work is seldom carried on in any one for any considerable time. They have never been found in good condition, but when a return visit would be made after an inspection, work would be going at a different place from that last inspected, and it must be confessed that comparatively little good has been accomplished by inspection at these mines.

#### ALTAMONT MINES.

Near Altamont.

P. O. Altamont.

Operated by the Altamont Coal Co., C. Crooke, President ; W. P. Crooke, Treasurer ; F. E. Sampson, Secretary.

Output in bushels for six months ending December 31, 1891 : Lump, 523,036 ; nut, 232,500 ; run of mines, 6,920 ; slack, 36,200. Total, 798,656.

Output in bushels for six months ending June 30, 1892 : Lump, 387,222 ; nut, 161,255 ; run of mines, 5,710 ; slack, 17,175. Total, 571,362.

Employes for the year ending June 30, 1892 : Maximum, inside, 207 ; outside, 49. Total, 256. Average, inside, 180 ; outside, 38. Total, 218.

Although the largest producers in the county, these mines are among the most poorly managed with respect to ventilation of any, that come within their class, to be found in Eastern Kentucky. In this particular, there has been considerable saving at the spigot and waste at the bung-hole here. A good fan ought to be secured for these mines.

#### PITMAN COAL COMPANY'S MINES.

Near Pittsburgh.

P. O. Pittsburgh.

Operated by the Pitman Coal Company. During the first part of the statistical period covered by this Report the officers of the company were : Thomas McRoberts, President ; S. V. Rowland, Treasurer and General Manager ; J. M. Bailey, Secretary. The mine then worked—the “ Woods Creek ”—being about exhausted, was abandoned January 14th, and operations, under a reorganized company, with a change of some of the officers,\*

\*W. A. Pugh, President ; Thos. McRoberts, Vice-President ; S. V. Rowland, Treasurer and General Manager ; J. M. Bailey, Secretary ; Wm. McNeill, Superintendent.

were transferred to what is known as the "Brown land," eastwardly from the old mines. From the new mines (consisting of two banks) comparatively little coal had been shipped up to June 30th. (See "New and Other Mines.")

Output in bushels for six months ending December 31, 1891 : Lump, 121,719 ; nut, 39,250 ; run of mines, 249,620 ; slack, 6,700. Total, 417,289.

Output in bushels for six months ending June 30, 1892 : All run of mines, 24,700.

Employees for the year ending June 30, 1892 : Maximum, inside, 60 ; outside, 8. Total, 68. Average, inside, 50 ; outside, 6. Total, 56.

#### LAUREL MINES.

Near Pittsburgh.

P. O. Pittsburgh.

Operated by the Laurel Coal Co., George Givens, President ; J. W. Bastin, Secretary and Superintendent.

Output in bushels for six months ending December 31, 1891 : Lump, 178,272 ; nut, 57,609 ; run of the mines, 323,602 ; mixed lump and nut, 72,558. Total, 632,041.

Output in bushels for six months ending June 30, 1892 : Lump, 112,989 ; nut, 39,958 ; run of mines, 303,643. Total 456,590.

Employees for the year ending June 30, 1892 : Maximum, inside, 125 ; outside, 12. Total, 137. Average, inside, 75 ; outside, 12. Total, 87.

The "Old Laurel" (No. 1) mine was abandoned about March 1st, last, being about exhausted. The indications were, when the mine was last visited, that the company would endeavor to make the new place a first-class mine,

#### VICTORIA MINE.

At Victoria.

P. O. Pittsburgh.

Operated by the Victoria Coal Co., W. M. Baxter, President ; J. E. Baxter, Secretary ; Joseph J. Hughes, Treasurer.

Output in bushels for the six months ending December 31, 1891 : Lump, 83,871 ; nut, 27,016 ; slack, 2,500 ; mixed lump and nut, 277,177. Total, 390,564.

Output in bushels for six months ending June 30, 1892 :

Lump, 39,398 ; nut, 16,860 ; slack, 6,000 ; mixed lump and nut, 229,133. Total, 291,391.

Employes for year ending June 30, 1892 : Maximum, inside, 65 ; outside, 7. Total, 72. Average, inside, 53 ; outside, 7. Total, 60.

This mine has been very much improved in all respects. During the year another air-shaft has been put down.

#### PEACOCK MINE.

Near Pittsburgh.

P. O. Pittsburgh.

Operated by the Peacock Coal Co., W. R. Letcher, President ; J. E. Greenleaf, Treasurer ; G. F. Anderson, Secretary ; C. D. Anderson, Superintendent.

Output in bushels during the six months ending December 31, 1891 : Lump, 134,903 ; nut, 32,964 ; mixed lump and nut, 247,361. Total, 415,228.

Output in bushels for six months ending June 30, 1892 : Lump, 104,126 ; nut, 30,933 ; slack, 7,500 ; mixed lump and nut, 253,030. Total, 395,589.

Employes for year ending June 30, 1892 : Maximum, inside, 85 ; outside, 15. Total, 100. Average, inside, 70 ; outside, 10. Total, 80.

When last visited the condition of this mine had been improved with respect to general safety, and the ventilation was better than it had been found for some time before. There was much yet to be done, however, before the mine could be considered in satisfactory condition.

#### THE LILY MINES.

At Lily.

P. O. Lily.

Operated by the Lily Mining and Manufacturing Co., J. I. Blanton, President ; R. Boyd, Vice-President ; Wm. Addams, Secretary ; Hywel Davies, General Manager.

Output in bushels for six months ending December 31, 1891 : Lump, 345,675 ; nut, 112,982 ; pea, 48,330. Total, 506,987.

Output in bushels for six months ending June 30, 1892 : Lump, 181,725 ; nut, 62,349 ; run of mines, 46,113 ; pea, 28,205. Total, 318,392.



Employees for year ending June 30, 1892: Maximum, inside, 94; outside, 35. Total, 129. Average, inside, 64; outside, 20. Total, 84.

When last visited work had, practically, been suspended at No. 2 mine. For the condition of No. 1 mine see Notice No. 309.

#### PULASKI COUNTY.

The coals wrought in this county belong to the Conglomerate series.

Output in bushels for the six months ending December 31, 1891: Lump, 162,688; nut, 101,527; run of mines, 295,876; slack, 148,450; mixed lump and nut, 725,821; pea, 16,530; miscellaneous, 10,000. Total, 1,460,892.

Output in bushels for six months ending June 30, 1892: Lump, 85,357; nut, 48,417; run of mines, 193,348; slack, 98,300; mixed lump and nut, 644,252. Total, 1,067,674.

Employees for the year ending June 30, 1892: Maximum, inside, 268; outside, 30. Total, 298. Average, inside, 204; outside, 26. Total, 230.

#### ALPINE MINES.

At Alpine.

P. O. Alpine.

Operated by the Richmond Coal Co., C. B. Finley, President; A. S. Glover, Vice-President; T. L. Richmond, Secretary and Treasurer; E. A. Foster, Mine Superintendent. Head office, Chattanooga, Tenn.

These mines are those formerly known under the name of Happy Hollow.

Output in bushels for six months ending December 31, 1891: Lump, 73,690; nut, 10,871; run of mines, 295,876; slack, 52,500; "miscellaneous," 10,000. Total, 442,937.

Output in bushels for six months ending June 30, 1892: Lump, 43,730; run of mines, 173,232. Total, 216,962.

Employees for the year ending June, 30, 1892: Maximum, inside, 71; outside, 10. Total, 81. Average, inside, 35; outside, 7. Total, 42.

When visited in June and July these mines were idle, and but little has been done at them since. In June the company

was putting in an Ingersoll-Sergeant compressed-air plant, with a view to using the Sergeant mining machines, and an abandoned drift was being reopened. See Notice 304.

#### BARREN FORK MINES.

At Barren Fork.

P. O. Flat Rock.

Operated by the Barren Fork Mining and Coal Company,\* Wm. Bright, Secretary and Treasurer; J. H. Holland, Superintendent. Head office, Lexington, Ky.

Output in bushels for the six months ending December 31, 1891: Lump, 88,998; nut, 90,655; slack, 68,750; mixed lump and nut, 580,821; pea, 16,531. Total, 845,755.

Output in bushels for six months ending June 30, 1892: Lump, 39,627; nut, 48,417; run of mines, 20,116; slack, 90,300; mixed lump and nut, 598,477. Total, 796,937.

Employes for year ending June 30, 1892: Maximum, inside, 147; outside, 16. Total, 163. Average, inside, 137; outside, 16. Total, 153.

These mines have been in better condition this year than ever before. See Notice 305.

#### GREENWOOD MINES.

At Greenwood.

P. O. Greenwood.

During the statistical period covered by this Report, the mines were operated by G. W. Grider and R. B. Overhuls, Lessees. They are now operated by the Greenwood Coal Co.

Output in bushels for six months ending December 31, 1891: Mixed lump and nut, 145,000; slack, 27,200. Total, 172,200.

Output in bushels for six months (two months of work) ending June 30, 1892: Mixed lump and nut, 45,775; slack, 8,000. Total, 53,775.

Employes for the year ending June 30, 1892: Maximum, inside, 50; outside, 4. Total, 54. Average, inside, 32; outside, 3. Total, 35.

Messrs. Grider & Overhuls closed down on February 19, 1892. Messrs. Chew & Co., now the Greenwood Coal Co., entered

\*The late Col. H. K. Milward was President of this Company at the time of his demise this year. The name of his successor has not been learned.

upon their lease July 1. There is but little more than "scraping ground" at the old works, and the new lessees do not expect to do much until they reach a fresh field of coal.

#### ROCKCASTLE COUNTY.

The coal wrought in this county, known as the "Pine Hill" seam, belongs to the Conglomerate series.

Output in bushels for six months ending December 31, 1891, all run of mines, 131,163.

Output in bushels for six months ending June 30, 1892, all run of mines, 137,358.

Employes during the year ending June 30, 1892: Maximum, inside, 71; outside, 11. Total, 82. Average, inside, 66; outside, 10. Total, 76.

#### THE MITCHELL MINES.

These mines, near Pine Hill, which were the only ones in operation during the first half of this year, were abandoned in June last. They have been entirely dismantled. Their abandonment thus early by the Mitchell Coal and Mining Co. (the company was organized in 1890), is not surprising to those who are familiar with the property—formerly pretty thoroughly worked by Mr. C. Crooke—selected for its operations.

Output in bushels for the six months ending December 31, 1891, all run of mines, 94,350.

Output in bushels for six months ending June 30, 1892, all run of mines, 137,358.

Employes for year ending June 30, 1892: Maximum, inside, 35; outside, 5. Total, 40. Average, inside, 36; outside, 6. Total, 42.

#### PINE HILL MINE.

Near Pine Hill.

P. O. Pine Hill.

Operated by the Pine Hill Coal and Iron Co., Smith P. Kerr, President; Wm. Mitchell, Vice-President; J. D. Simpson, Treasurer; W. M. Gay, Secretary. Head office, Winchester, Kentucky.

This company suspended operations in August, 1891, and did

not resume them until July 25th last, the company having been reorganized July 15. The output for the months of July and August, 1891, amounted to 36,813 bushels, all run of mines. At this time there are 80 persons employed underground and 10 outside. John Morrison is now Superintendent.

#### WHITLEY COUNTY.

The larger part of the commercial product of this county is derived from the No. 3 seam of this field, known in this region as the "Jellico Coal." One mine, that of the Pine Knot Coal Co., is in one of the coals belonging to the Conglomerate Series.

Output in bushels for the six months ending December 31, 1891: Lump, 2,165,825; nut, 844,750; run of mines, 381,734; slack, 309,425; mixed lump and nut, 176,700; pea, 47,225; slack and nut, 276,075. Total, 4,201,734.

Output in bushels for six months ending June 30, 1892: Lump, 1,417,837; nut, 567,800; run of mines, 805,142; slack, 292,663; mixed lump and nut, 213,240; pea, 29,875; nut and slack, 251,550. Total, 3,578,107.

Employes for the year ending June 30, 1892: Maximum, inside, 752; outside, 218. Total, 970. Average, inside, 570; outside, 125. Total, 695.

#### DOWLAIS COLLIERY.

At Dowlais.

P. O. Jellico, Tenn.

Operated by the East Tennessee Coal Company, E. J. Davis, President and General Manager; F. C. Richmond, Secretary and Treasurer; Philip Francis, Mine Superintendent. Principal office, Knoxville, Tenn.

Output in bushels for six months ending December 31, 1891: Lump, 568,875; nut, 225,875; run of mines, 64,400; slack, 81,200; mixed lump and nut, 3,175; nut and slack, 123,300. Total, 1,066,825.

Output in bushels for six months ending June 30, 1892: Lump, 364,050; nut, 97,075; run of mines, 112,400; slack, 58,125; mixed lump and nut, 23,500; nut and slack, 126,050. Total, 781,200.

Employes for year ending June 30, 1892 : Maximum, inside, 190 ; outside, 50. Total, 240. Average, inside, 130 ; outside, 40. Total, 170.

Very considerable improvements have been made of the condition of this mine. A second ventilating furnace has been built. The introduction of the rope-haulage system here has been noted on a preceding page. See Notice 282.

#### KENSSEE MINES.

At Kensee.

P. O. Kensee.

Operated by the Main Jellico Mountain Coal Co., Hywel Davies, General Manager ; William Jones, Mine Superintendent. (No other officers are named in the yearly report.)

Output in bushels for six months ending December 31, 1891 : Lump, 639,087½ ; nut, 238,625 ; run of mines, 55,500 ; slack, 104,362½ ; mixed lump and nut, 141,375 ; pea, 47,225 ; nut and slack, 49,600. Total, 1,275,775.

Output in bushels for six months ending June 30, 1892 : Lump, 408,662 ; nut, 121,375 ; run of mines, 104,825 ; slack, 68,775 ; mixed lump and nut, 70,925 ; pea, 29,875 ; nut and slack, 16,525. Total, 820,962.

Employes for year ending June 30, 1892 : Maximum, inside, 190 ; outside, 50. Total, 240. Average, inside, 165 ; outside, 20. Total, 185.

About two-thirds of the company's railroad has been relaid with steel during the year. See Inspection Notice 280.

#### CENTRAL JELICO MINE.

Near Pleasant View.

P. O. Pleasant View.

Operated by the Central Jellico Coal Company, J. P. Mahan, President ; T. B. Mahan, Vice-President ; J. W. Siler, Secretary and Treasurer ; John Phillips, Superintendent.

Output in bushels for six months ending December 31, 1891 : Lump, 107,037½ ; nut, 65,375 ; run of mines, 500 ; slack, 43,562½ ; mixed lump and nut, 8,825. Total, 225,300.

Output in bushels for six months ending June 30, 1892 : Lump, 159,000 ; nut, 209,525 ; run of mines, 5,725 ; slack, 100,062 ; mixed lump and nut, 76,865. Total, 551,177.

Employees for year ending June 30, 1892: Maximum, inside, 100; outside, 30. Total, 130. Average, inside, 48; outside, 13. Total, 61.

See Inspection Notice No. 308. In a letter dated October 3d, Mr. Phillips writes in reference to what has been done since said Notice was served. He states that the Cox and Croger room has been timbered and stopped; that B entry has been cut through to B2 and no work is going on in B2; that the Elliott entry has been stopped; that all rooms in the Bird Bank have been stopped, and the greater part of the pillars drawn; that doors and brattices were being placed in the A<sup>1</sup> and A<sup>2</sup> and Old B entries so as to send the air as required.

#### PROCTER MINE.

At Red Ash.

P. O. Red Ash.

Operated by the Procter Coal Co., W. E. Grinstead, President; S. E. Jones, Vice-President; H. C. Grinstead, Secretary and Treasurer; W. T. Lewis, General Manager at Mines. Head office, Louisville, Ky.

Output in bushels for six months ending December 31, 1891: Lump, 850,825; nut, 314,875; run of mines, 65,650; slack, 80,300; mixed lump and nut, 23,325; nut and slack, 103,175. Total, 1,438,150.

Output in bushels for six months ending June 30, 1892: Lump, 486,125; nut, 139,825; run of mines, 126,500; slack, 65,700; mixed lump and nut, 41,950; nut and slack, 108,975. Total, 969,075.

Employees for the year ending June 30, 1892: Maximum, inside, 196; outside, 55. Total, 251. Average, inside, 156; outside, 40. Total, 196.

See Inspection Notices 306 and 307.

#### MOUNTAIN ASH MINE.

At Merthyr.

P. O. Mountain Ash.

Operated by the Jellico Coal Mining Co., E. J. Davis, President; David Groves, Vice-President; F. C. Richmond, Treasurer; Chas. Ducloux, Treasurer; E. Griffith, Mine Superintendent.

This is a new mine, in the Jellico seam. When visited in August, the preliminary work was well under way, and shipments were expected to be made about the middle of the present month (October).

STRUNK'S LANE MINE.

At Strunk's Lane.

P. O. Strunk's Lane.

Operated by the Pine Knot Coal Co., M. Phillips, President; L. M. Jackson, General Manager and Treasurer; J. D. McKnight, Secretary.

The coal wrought belongs to the Conglomerate Series.

Output in bushels for six months ending December 31, 1891, all run of mines, 195,684.

Output in bushels for six months ending June 30, 1892, all run of mines, 455,692.

\* Employees for year ending June 30, 1892: Maximum, inside, 76; outside, 33. Total, 109. Average, inside, 71; outside, 12. Total, 83.

Although opened within the previous year, the equipment of this mine has, practically, all been done within the year ending June 30th, 1892.

See Inspection Notice 303. The ventilating fan was in place by August, and was giving satisfactory results.

*WESTERN DISTRICT.***BUTLER COUNTY.**

There is but one commercial mine in operation in this county. The bed wrought is deemed the equivalent of the "Mud River" seam, which may be regarded as probably the equivalent of Owen's Coal 1 B. The quality of the coal is uncommonly good.

**ABERDEEN MINE.**

At Aberdeen.

P. O. Morgantown.

Operated by the Aberdeen Coal and Mining Co., J. D. Ren-der, President; G. W. Quinn, Vice President; E. P. Aspley, Secretary and Treasurer; J. F. Phillips, Superintendent.

Output in bushels for the six months ending December 31, 1891: Lump, 129,921; nut, 39,902; run of mines, 2,460; slack, 19,932. Total, 192,265.

Output in bushels for six months ending June 30, 1892: Lump, 134,507; nut, 45,460; slack, 23,302. Total, 203,269.

Employes for the year ending June, 30, 1892: Maximum, inside, 39; outside, 5. Total, 44. Average, inside, 31; outside, 5. Total, 36.

During the year, additions were made to the equipment of bank-cars, two 5,000-bushel barges were built, a new tippie was constructed, five dwellings were erected, and other outside im-provements were made.

See Inspection Notice No. 315.

**CHRISTIAN COUNTY.**

There is but one shipping mine in operation in this county at the date of this Report. The coal wrought, known in this sec-tion as the "Empire Coal," is deemed the lowest workable bed, and is probably the equivalent of the "Mud River Seam." It is an erratic coal as to thickness, ranging within comparatively short distances from 44 or 48 inches to 2 inches—in some places almost thinning out. The very thin places, however, seem to



occur in limited areas, and to be due to stream erosion in some cases, and in others to hummocks in the under-clay. The usual thickness is from 36 to 42 inches.

#### THE EMPIRE MINE.

At Empire.

P. O. Empire.

Operated by the Empire Coal and Mining Co., Jno. D. Anderson, President; J. B. Richardson, Vice-President; W. T. Rutland, Treasurer.

Output in bushels for six months ending December 31, 1891: Lump, 318,390; nut, 44,225; run of mines, 18,820; slack, 84,800. Total, 466,235.

Output in bushels for six months ending June 30, 1892: Lump, 223,318; nut, 28,425; run of mines, 6,080; slack, 58,875. Total, 316,698.

Employes for the year ending June 30, 1892: Maximum, inside, 131; outside, 35. Total, 166. Average, inside, 101; outside, 13. Total, 114.

The scales, weighing office, and tip have been remodeled. No other special improvements have been made during the year.

#### CRITTENDEN COUNTY.

The bed wrought is the "Bell Seam," deemed No. 1 B of Dr. Owen. The two mines putting out commercial coal—C. BARNABY & SON'S, near Sturgis (Union county), and LAMB'S, (leased by Davis & Pike), near Caseyville—have been worked in rather a desultory way, and the total product has been small—amounting to only 78,000 bushels for the year ending June 30, 1892. Preparations have been made at the BARNABY mine by putting down a new slope to connect with the Tradewater river, whereby a larger business may be secured.

#### DAVEISS COUNTY.

Most of the coal dug in this county is produced at small banks, of which there are many, at which less than five persons are employed, or at which more than that number are employed for only short periods of the year. The total output of what may be deemed commercial coal amounted to 264,050 bushels

for the six months ending December 31, 1891 ; and to 273,223 bushels for the six months ending June 30, 1892. The total number of employes at the ten mines producing that coal for the year ending June 30, 1892, was : Maximum, inside, 73 ; outside, 21. Total, 94. Average, inside, 48 ; outside, 13. Total, 61.

#### NALL'S MINE.

Near Owensboro.

P. O. Owensboro.

Owned and operated by C. L. Nall.

Output in bushels for six months ending December 31, 1891 : Lump, 47,356 ; nut, 8,249 ; run of mines, 21,673 ; slack, 11,272. Total, 88,550.

Output in bushels for six months ending June 30, 1892 : Lump, 50,047 ; nut, 9,165 ; run of mines, 19,030 ; slack, 14,856. Total, 93,098.

Employes for the year ending June 30, 1892 : Maximum, inside, 15 ; outside, 2. Total, 17. Average, inside, 10 ; outside, 2. Total, 12.

During the year, safety-catches were put on the cage and a water-shaft, provided with a wind-mill for raising the water from the mine, was put down. See Notice 285.

#### NEW HOLLAND MINE.

At Mattingly.

P. O. Owensboro.

Operated by D. W. Sloane, under the name of the New Holland Coal Co., during the statistical period covered by this Report. Now operated by H. G. Simmons.

Output in bushels for the month of December (first month shipping), 1891 : Lump, 10,500 ; nut and slack, 1,500. Total, 12,000.

Output in bushels for six months ending June 30, 1892 : Lump, 33,375 ; run of mines, 8,460 ; slack, 1,500 ; nut and slack, 8,790. Total, 52,125.

Employes for year ending June 30, 1892 : Maximum, inside, 17 ; outside, 7. Total, 24. Average, inside, 9 ; outside, 3. Total, 12.

This mine has been awkwardly opened, and the workings have been carried forward in very unsystematic fashion. See Notice 286.

## OTHER MINES.

Other mines, the product of which is included in the returns for the county, are : *Parson's*, *James'*, *Bruck's* (Deane's), *J. H. Rudy's*, *Patrick's*, and the "*Bon Harbor*" (Meis & Shafer). All are in the vicinity of Owensboro, except that of Mr. William James, which is near Lewis Station (P. O. Utica).

## HANCOCK COUNTY.

The coals worked in this county belong to the lower part of the General Section. During the statistical period covered by this Report, there were no bituminous shipping mines in operation. The largest bituminous mine, measured by production, was

## THE NEW HOPE MINE,

Operated by Mr. D. W. Sloane, near Cloverport. The output for the year ending June 30, 1892, amounted to 31,000 bushels. From 7 (4 inside) to 12 (8 inside) persons were employed during the year.

## THE BRECKENRIDGE MINES (CANDEL).

At Victoria.

P. O. Cloverport, Breckenridge Co.

Operated by the Breckenridge Company, Limited, William Hopper, Managing Director ; James Heron, Mine Superintendent, lately succeeded by George Bentley.

Output for six months ending December 31, 1891, 8,665.21 short tons.

Output for six months ending June 30, 1892, 6,145 tons.

The product of these mines, which consist of a number of drifts, is used principally for gas-making. The celebrity of the coal in the candle markets of the world has, perhaps, played no small part in directing attention to Kentucky as a field for candle mining. The mines, so far as regards known thickness of workable coal, are approaching exhaustion. See Notice 284.

## THE FALCON MINE.

At Falcon.

P. O. Hawesville.

Operated by the Hawesville Coal Co., W. S. Morrison, Presi-

dent ; I. C. Adair, Secretary and Treasurer ; John S. Adair, Superintendent.

This mine, which commenced producing in July, 1892, is noted on a preceding page. See "New and Other Mines."

#### HENDERSON COUNTY.

Of the five mines of importance in this county, only two make shipments.

Output in bushels for the six months ending December 31, 1891: Lump, 828,409 ; nut, 242,286 ; run of mines, 58,533 ; slack, 65,885 ; mixed lump and nut, 5,500 ; pea, 72,019. Total, 1,272,632.

Output in bushels for six months ending June 30, 1892: Lump, 630,394 ; nut, 158,929 ; run of mines, 486,199 ; slack, 119,904 ; mixed lump, 3,125 ; pea, 31,871 ; nut and slack, 625 ; pea and slack, 790. Total, 1,431,837.

Employes for year ending June 30, 1892: Maximum, inside, 282 ; outside, 73. Total, 355. Average, inside, 155 ; outside, 34. Total, 189.

#### PEOPLE'S MINE.

Near Henderson.

P. O. Henderson.

Operated by Peter J. McNamara.

Output in bushels for six months ending December 31, 1891: Lump, 24,988 ; nut, 6,475 ; run of mines, 4,630 ; slack, 1,971 ; pea, 1,584. Total, 39,648.

Output for six months ending June 30, 1892: Lump, 27,402 ; nut, 4,617 ; slack, 3,220 ; pea, 1,565. Total, 36,804.

Employes for year ending June 30, 1892: Maximum, inside, 9 ; outside, 3. Total, 12. Average, inside, 6 ; outside, 3. Total, 9.

This mine is entered by a shaft, and has but one opening—which is permissible *under the law*, so long as there are not "more than ten persons" employed underground at one time. The mine has become a death-trap. Mr. McNamara has exhibited small regard for the obligations resting upon him—those arising from his position as employer, from the mining law, and from his emphatic promises, oral and written, to the Inspector of Mines. The matter was placed in the hands of the Common-

wealth's Attorney in the Spring, but just too late for that term of court. It will be presented to the grand jury at the October term. See Notice 287. Since that notice was served, the works referred to in it have closed in, and it has become necessary to open new ground. Unless a radical change is made in the methods of "management" at this place, the shaft will be lost. It is a courageous man who will work in the mine, under existing circumstances, with only one means of egress.

#### GREEN RIVER MINE (SPOTTSVILLE).

Near Spottsville.

P. O. Spottsville.

Operated by T. Shiver & Bros., Tilman Shiver, Manager.

Output in bushels for six months ending December 31, 1891: Lump, 528,496; nut, 160,898; pea, 55,299. Total, 744,693.

Output in bushels for six months ending June 30, 1892: Lump, 207,117; nut, 49,372; run of mines, 255,183; slack, 8,000; pea, 10,790. Total, 530,462.

Employes for the year ending June 30, 1892: Maximum, inside, 148; outside, 40. Total, 188. Average, inside, 75; outside, 15. Total, 90.

This mine has been placed in better condition than it has ever before been known to be in. No special outside improvements were made during the statistical year. See Notice 292.

#### HENDERSON MINE.

At Henderson.

P. O. Henderson.

Operated by the Henderson Mining and Manufacturing Company, John O'Byrne, President; A. B. Sights, Secretary and Treasurer; C. W. Wilson, M. Schlamp, A. S. Winstead and J. L. Lambert, Directors.

Output in bushels for six months ending December 31, 1891: Lump, 45,956; nut, 26,039; run of mines, 45,228; slack, 11,167; pea, 15,136. Total, 143,526.

Output in bushels for six months ending June 30, 1892: Lump, 53,904; nut, 33,693; run of mines, 70,891; slack, 11,116; pea, 19,516; pea and slack, 790. Total, 189,910.

Employes for year ending June 30, 1892: Maximum, inside,

30 ; outside, 11. Total, 41. Average, inside, 19 ; outside, 5. Total, 24.

No special improvements have been made during the year. The mine is usually found in fair condition. It would be wise, however, to leave thicker pillars than is now done.

#### BASKETT MINE.

At Baskett.

P. O. Baskett.

Operated by the Baskett Coal Co., C. L. Nall, President ; Ben T. Kinsey, Vice-President ; R. S. Eastin, Secretary and Treasurer.

Output in bushels for six months ending December 31, 1891 : Lump, 194,846 ; nut, 40,845 ; run of mines, 2,000 ; slack, 47,350 ; mixed lump and nut, 5,500. Total, 290,541.

Output in bushels for six months ending June 30, 1892 : Lump, 311,050 ; nut, 65,400 ; run of mines, 160,125 ; slack, 93,250 ; mixed lump and nut, 3,125 ; nut and slack, 625. Total, 633,575.

Employes for year ending June 30, 1892 : Maximum, inside, 85 ; outside, 15. Total, 100. Average, inside, 50 ; outside, 10. Total, 60.

No special improvements during the year. The upper portion of the shaft of this mine, being so very much out of plumb as it is, is a constant menace to the safety of the shaft. See Notice 291.

#### CORYDON MINE.

At Corydon.

P. O. Corydon.

Operated by the Corydon Coal Co., H. A. Powell, President ; B. M. Powell, Superintendent and Manager.

Output in bushels for six months ending December 31, 1891 : Lump, 34,123 ; nut, 8,029 ; run of mines, 6,675 ; slack, 5,397. Total, 54,224.

Output in bushels for six months ending June 30, 1892 : Lump, 30,921 ; nut, 5,487 ; slack, 4,318. Total, 41,086.

Employes for the year ending June 30, 1892 : Maximum, inside, 10 ; outside, 4. Total, 14. Average, inside, 5 ; outside, 1. Total, 6.

This mine has only one means of ingress and egress. The

roof is very treacherous and should the mine once start to close, it would be impossible to arrest it. There ought to be a second shaft to the mine, but, under the law, there is no power in the Inspector to have one sunk so long as no more than ten persons are employed underground. The company feels, so it is understood, that the amount of its trade would not justify the expense of a second shaft. And so the matter stands. See Notice 297.

#### HOPKINS COUNTY.

Coals No. 9 and No. 11 are the ones wrought at the commercial mines now in operation.

Output in bushels for six months ending December 31, 1891 : Lump, 3,610,675 ; nut, 1,088,297 ; run of the mines, 467,266 ; slack, 511,175 ; mixed lump and nut, 2,399,137 ; pea, 123,014 ; slack and pea, 602,974 ; lump, nut and slack, mixed, 18,297. Total, 8,820,835.

Output in bushels for six months ending June 30, 1892 : Lump, 2,838,439 ; nut, 1,034,052 ; run of mines, 848,649 ; slack, 415,407 ; mixed lump and nut, 2,756,374 ; pea, 60,378 ; mixed lump, nut and slack, 62,678 ; nut and slack, 1,600 ; slack and pea, 820,991. Total, 8,838,568.

Most of the "slack and pea" was converted into coke.

Employes for the year ending June 30, 1892 : Maximum inside, 1,236 ; outside, 1,060. Total, 2,296.

#### CO-OPERATIVE MINES.

At Barnsley.

P. O. Barnsley.

Operated by the "Co-operative Mining and Manufacturing Company of Hopkins County, Kentucky," J. Denny (?) President ; S. Platt, Secretary ; Jas. Green, Mine Superintendent ; Joe Lavanna, W. T. Owens, F. Ivey, F. Perkins and George Wade, Directors.

Output in bushels for six months ending December 31, 1891 : Lump, 267,369 ; nut, 75,748 ; run of mines, 32,562 ; slack, 78,672 ; mixed lump and nut, 76,948 ; lump, nut and slack, mixed, 18,297. Total, 549,596.

Output in bushels for six months ending June 30, 1892 :

Lump, 189,465 ; nut, 63,300 ; run of mines, 107,128 ; slack, 69,100 ; mixed lump and nut, 14,273 ; mixed lump, nut and slack, 62,678. Total, 505,944.

Employees for the year ending June 30, 1892 : Maximum, inside, 81 ; outside, 21. Total, 102. Average, inside, 65 ; outside, 10. Total, 75.

No special improvements were made during the year.

#### OAK HILL MINES.

Near Nortonville.

P. O. Nortonville.

Operated by the Oak Hill Coal and Mining Co. (Stull & Childress), L. T. Stull, Secretary and Superintendent.

Output in bushels for six months ending December 31, 1891 : Lump, 12,290 ; nut, 3,300. Total, 15,590.

Output for six months ending June 30, 1892 : Lump, 38,000 ; nut, 9,850 ; run of mines, 1,000 ; slack, 4,800. Total, 53,650.

Employees during year ending June 30, 1892 : Maximum, inside, 10 ; outside, 4. Total, 14. Average, inside, 5 ; outside, 3. Total, 8.

No. 9 is the coal wrought. By error it was stated in a preceding Report that the No. 11 bed was worked here. During the year 1,400 feet of railroad track were laid, and additions were made to the equipment of bank-cars.

#### REINECKE MINES.

Near Madisonville.

P. O. Madisonville.

Operated by the Reinecke Coal Co., Conrad Reinecke, President ; Inkerman Bailey, Secretary ; Louis Feger, Superintendent.

Output in bushels for six months ending December 31, 1891 : Lump, 549,098 ; nut, 111,791 ; run of mines, 281,356 ; slack, 84,200 ; mixed lump and nut, 134,456 ; pea, 123,014. Total, 1,283,915.

Output in bushels for six months ending June 30, 1892 : Lump, 318,878 ; nut, 93,371 ; run of mines, 480,646 ; slack, 102,011 ; mixed lump and nut, 124,427 ; pea, 60,378. Total, 1,179,711.

Employees for the year ending June 30, 1892 : Maximum, inside, 175 ; outside, 21. Total, 196. Average, inside, 150 ; outside, 15. Total, 165.



This company has two mines, reached by the same shaft, in No. 9 and No. 11 coals, respectively. Work during the past year has been in the No. 11 mine exclusively. See Notices 276 and 326.

#### MADISONVILLE MINE.

Near Madisonville.

P. O. Madisonville.

Operated by the Madisonville Coal Co., Chesley Williams, President; C. E. Merton, Secretary and Treasurer; R. S. Dulin, Superintendent.

Output in bushels for six months ending December 31, 1891: Lump, 36,713; nut, 9,178. Total, 45,891.

Output in bushels for six months ending June 30, 1892: Lump, 86,431; nut, 40,754; run of mines, 37,147; slack, 32,700. Total, 197,032.

Employes for the year ending June 30, 1892: Maximum and average, inside, 25; outside, 15. Total, 40.

Coal No. 11 is the bed worked. During the year ten dwellings have been built. See Notices 277 and 325.

#### NO. 11 PEACOCK MINE.

Near Earlington.

P. O. Earlington.

Operated by J. L. M. Robertson & Son.

Output in bushels for six months ending December 31, 1891: Lump, 28,425; nut, 6,462; slack, 500. Total, 35,387.

Output in bushels for six months ending June 30, 1892: Lump, 15,950; nut, 4,425; slack, 500. Total, 20,875.

Employes for the year ending June 30, 1892: Maximum, 8. Average, 5.

#### HECLA MINE.

Near Earlington.

P. O. Earlington.

Opened by the Hecla Coal and Mining Co., Col. Jo. F. Foard, President; W. F. Anderson, Secretary and Treasurer.

Output in bushels for six months ending December 31, 1891: Lump, 239,823; nut, 92,345; run of mines, 153,348; slack, 82,160. Total, 567,676.

Output in bushels for six months ending June 30, 1892: Lump, 205,997; nut, 72,402; run of mines, 222,728; slack, 85,710; nut and slack, 1,600. Total, 588,437.

Employees for year ending June 30, 1892: Maximum, inside, 162; outside, 15. Total, 177. Average, inside, 154; outside, 15. Total, 169.

The coal wrought is No. 9. The electric plant for mining and haulage, which has been described heretofore, was installed during the statistical year. The entire output of the mine is now mined by machine. A ventilating fan, operated by electricity, has been put in. See Notice 288.

#### ST. BERNARD NO. 9 AND NO. 11 MINES.

Near Earlington.

P. O. Earlington.

Operated by the St. Bernard Coal Co., Col. E. G. Sebree, President; Jno. B. Atkinson, Vice-President and Treasurer; Geo. C. Atkinson, Secretary.

Output in bushels for six months ending December 13, 1891: Lump, 916,825; nut, 299,177; slack, 3,875; mixed lump and nut, 1,397,848; slack and pea, 271,511. Total, 2,889,236.

Output in bushels for six months ending June 30, 1892: Lump, 746,466; nut, 345,431; mixed lump and nut, 1,482,943; slack and pea, 245,184. Total, 2,820,024.

Employees for the year ending June 30, 1892: Maximum, inside, 362; outside, 192. Total, 554. Average, inside, 331; outside, 180. Total, 511.

As indicated by their names, these two mines are, respectively, in No. 9 and No. 11 coals. During the year the company has increased its coke plant to 104 ovens; has built and has in operation 6 Campbell Coal-washers, and has added to its equipment one Ingersoll Air Compressor of 125-horse power, and one mine locomotive. The underground management of these mines is worthy of the highest praise. Mr. Ben. W. Robinson is the company's mining engineer.

#### DIAMOND MINE.

Near Morton's Gap.

P. O. Morton's Gap.

Operated by the St. Bernard Coal Co. (See preceding.) Principal office, Earlington. — Harriss, Mine Superintendent.

Output in bushels for six months ending December 31, 1891: Lump, 469,970; nut, 172,575; slack, 94,114; mixed lump and nut, 476,884; slack and pea, 150,963. Total, 1,364,506.

Output in bushels for six months ending June 30, 1892: Lump, 323,359; nut, 163,210; mixed lump and nut, 510,116; slack and pea, 305,057. Total, 1,301,742.

Employees for the year ending June 30, 1892: Maximum, inside, 141; outside, 20. Total, 161. Average, inside, 116; outside, 18. Total, 134.

The coal wrought is No. 9. See Notice 327.

#### ST. CHARLES MINE.

At St. Charles.

P. O. St. Charles.

Operated by the St. Bernard Coal Co. (See preceding.) Barton Crutchfield, Mine Superintendent. Principal office: Earlington.

Output in bushels for six months ending December 31, 1891: Lump, 762,382; nut, 199,384; slack, 71,625; mixed lump and nut, 189,251; slack and pea, 180,500. Total, 1,403,642.

Output in bushels for six months ending June 30, 1892: Lump, 669,638; nut, 150,373; mixed lump and nut, 411,990; slack and pea, 270,750. Total, 1,502,751.

Employees for year ending June 30, 1892: Maximum, inside, 166; outside, 43. Total, 209. Average, inside, 153; outside, 40. Total, 193.

The coal wrought is No. 9. The company will add one air-compressor, of 125-H. P., to its equipment during the present year. See Notice 289.

#### CRABTREE MINE.

At Crabtree.

P. O. Iisley.

Operated by the Crabtree Coal Mining Co., A. Howell (Clarks-ville, Tenn.), President; P. M. Salmon, Secretary and Treasurer.

Output in bushels for six months ending December 31, 1891: Lump, 327,780; nut, 117,837; slack, 96,029; mixed lump and nut, 123,750. Total, 665,396.

Output in bushels for six months ending June 30, 1892: Lump, 244,255; nut, 90,936; slack, 120,586; mixed lump and nut, 212,625. Total, 668,402.

Employees for the year ending June 30, 1892: Maximum, inside, 109; outside, 26. Total, 135. Average, inside, 83; outside, 26. Total, 109.

The coal wrought is No. 9. See Notice 290.

**McLEAN COUNTY.**

The only commercial mines in this county are those of McKinney & Stanley, known as

**THE ROBINSON MINES.**

Near Island.

P. O. Island.

There are two mines, known as *Robinson No. 1* and *Robinson No. 2*, the former being on Green River, and the latter, nearer to Island, on the Owensboro & Russellville Railroad. The statistics here given are combined for the two.

Output in bushels for six months ending December 31, 1891 : Lump, 146,693 ; nut, 46,193 ; run of mines, 12,028 ; slack, 50,080 ; mixed lump and nut, 26,331. Total, 281,325.

Output in bushels for six months ending June 30, 1892 : Lump, 96,048 ; nut, 32,275 ; run of mines, 14,732 ; slack, 45,717 ; mixed lump and nut, 41,971. Total, 230,743.

Employes for year ending June 30, 1892 : Maximum, inside, 71 ; outside, 10. Total, 80. Average, inside, 37 ; outside, 7. Total, 44.

When visited September 21, the No. 2 mine was in the last stages of exhaustion. Practically all the work was on stumps and pillars. It was then expected that the mine would be ready for abandonment by the middle of next January, when the new shaft-mine, now being opened to the south of Island, would be sufficiently developed for all the work to be concentrated there.

**MUHLENBERG COUNTY.**

The coal wrought at the commercial mines at present is No. 9, except at Paradise, where No. 11 is worked, and at Mud River, where what is deemed the equivalent of No. 1 B is mined.

Output in bushels for six months ending December 31, 1891 : Lump, 1,746,271 ; nut, 382,239 ; run of mines, 359,083 ; slack, 283,136 ; mixed lump and nut, 500,937 ; pea, 86,324 ; steam, 117,902. Total, 3,475,892.

Output in bushels for six months ending June 30, 1892 : Lump, 1,374,194 ; nut, 257,360 ; run of mines, 425,265 ; slack,

326,111 ; mixed lump and nut, 612,749 ; pea, 84,998 ; steam, 73,207. Total, 3,153,884.

Employees for year ending June 30, 1892 : Maximum, inside, 551 ; outside, 129. Total, 680. Average, inside, 489 ; outside, 101. Total, 590.

#### MEMPHIS MINE.

At Bevier.

P. O. Bevier.

Operated by Capt. J. W. Moores and W. H. Moore, lessees of Memphis Coal and Mining Co., Capt. J. W. Moores, Superintendent and Manager.

Output in bushels for six months ending December 31, 1891 : Lump, 110,300 ; nut, 23,237 ; run of mines, 204,658 ; slack, 91,786 ; mixed lump and nut, 377,097. Total, 807,078.

Output in bushels for six months ending June 30, 1892 : Lump, 113,205 ; nut, 22,624 ; run of mines, 161,573 ; slack, 111,712 ; mixed lump and nut, 357,058. Total, 766,172.

Employees for the year ending June 30, 1892 : Maximum, inside, 145 ; outside, 17. Total, 162. Average, inside, 125 ; outside, 10. Total, 135. See Notice 313.

#### MUD RIVER MINE.

At Mud River.

P. O. Mud River.

Operated by the Mud River Coal, Coke and Iron Co., Isaac Litton, President ; Jno. C. Gordon, Vice-President ; W. G. S. Anderson, Secretary and Treasurer.

Output in bushels for six months ending December 31, 1891 : Lump, 382,686 ; nut, 82,850 ; pea, 57,050. Total, 522,586.

Output in bushels for the six months ending June 30, 1892 : Lump, 294,272 ; nut, 59,400 ; mixed lump and nut, 56,200. Total, 409,872.

Employees for year ending June 30, 1892 : Maximum, inside, 99 ; outside, 16. Total, 115. Average, inside, 76 ; outside, 10. Total, 86.

A revolving screen was put in during the year. See Notice 316.

## CENTRAL MINE.

At Central City.

P. O. Central City.

Operated by the Central Coal and Iron Co., B. duPont, President; Thos. J. Tapp, Vice-President; Bannen Coleman, Secretary; T. C. duPont, Superintendent. Principal office, Louisville, Ky.

Output in bushels for six months ending December 31, 1891: Lump, 899,243; nut, 210,042; run of mines, 104,772; slack, 184,850. Total, 1,398,907.

Output in bushels for six months ending June 30, 1892: Lump, 598,263; nut, 86,526; run of mines, 80,462; slack, 161,099. Total, 926,350.

Employees for year ending June 30, 1892: Maximum, inside, 171; outside, 77. Total, 148. Average, inside, 157; outside, 63. Total, 220.

No special improvements were made during the year. See Notice 296.

## PIERCE MINES.

At Ricedale.

P. O. Drakesboro.

Operated by James T. Pierce, Lessee of the Green River Coal and Mining Co., of which James T. Pierce is President, and H. W. Buttorff, Vice-President. The company made an assignment about the middle of last May, Mr. John W. Stark, of Bowling Green, Ky., being made assignee. The published reasons for the assignment indicated that it was consequent upon a judgment for \$6,000, rendered against the company in a damage suit.

Output in bushels for six months ending December 31, 1891: Lump, 152,000; nut, 29,661; run of mines, 7,950; pea, 29,274; steam, 112,827. Total, 331,712.

Output in bushels for six months ending June 30, 1892: Lump, 120,707; nut, 25,915; run of mines, 102,620; slack, 3,000; mixed lump and nut, 1,500; pea, 23,100; steam, 73,207. Total, 350,049.

Employees for year ending June 30, 1892: Maximum, inside, 59; outside, 34. Total, 93. Average, inside, 50; outside, 28. Total, 78.

There are three mines here, one in No. 11 coal, one in No. 12,

both reached by a slope, and one in No. 9, reached by a shaft. The slope has been carried from No. 11 down to No. 9 coal, having been completed last April, and it is now used as an upcast and second outlet for the No. 9 mine—the latter being the only mine now in operation. See Inspection Notice 314.

#### DOVEY'S KENTUCKY MINE.

At Mercer Station.

P. O. Mercer Station.

Operated by T. C. duPont, Assignee; Wm. H. Dovey, Manager.

Output in bushels for six months ending December 31, 1891: Lump, 12,064; nut, 3,200; slack, 5,925; mixed lump and nut, 12,000. Total, 33,189.

Output in bushels for six months ending June 30, 1892: Lump, 53,993; nut, 19,000; run of mines, 75,070; slack, 43,075; mixed lump and nut, 143,075. Total, 334,213.

Employes for year ending June 30, 1892: Maximum and average, inside, 81; outside, 10. Total, 91.

No special improvements were made during the year. See Notice 311.

#### POWDERLY MINE.

At Powderly.

P. O. Powderly.

Operated by the Greenville Co-operative Mining and Manufacturing Co., H. C. Mercer, President; Jno. M. Payne, Superintendent; T. Y. Foster, Secretary and Treasurer.

Output in bushels for six months ending December 31, 1891: Lump, 150,981; nut, 26,350; run of mines, 3,357; mixed lump and nut, 109,340; steam, 5,075. Total, 295,103.

Output in bushels for six months ending June 30, 1892: Lump, 106,606; nut, 20,471; run of mines, 4,300; slack, 500; mixed lump and nut, 76,525. Total, 208,402.

Employes for year ending June 30, 1892: Maximum, inside, 45; outside, 6. Total, 51. Average, inside, 42; outside, 6. Total, 48.

No special outside improvements were made during the year. See Notice 317.

## PARADISE MINE.

At Paradise.

P. O. Paradise.

Operated by J. Wm. Jones, Lessee of the Green River Coal and Mining Co.

Output in bushels for six months ending December 31, 1891, all run of mines, 38,346.

Output in bushels for six months ending June 30, 1892: Lump, 23,201; nut, 9,824; pea, 5,698. Total, 38,723.

Employes for year ending June 30, 1892: Maximum, inside, 10; outside, 3. Average, inside, 8; outside, 2.

No special improvements were made during the year. This mine, as in the case of the "Pierce," is in the hands of Mr. J. W. Stark, assignee.

## HILLSIDE MINE.

At Hillside.

P. O. Mercer Station.

Operated by the Hillside Coal Co., J. W. Lam, Secretary and Treasurer.

Output in bushels for six months ending December 31, 1891: Lump, 38,997; nut, 6,899; slack, 575; mixed lump and nut, 2,500. Total, 48,971.

Output in bushels for six months ending June 30, 1892: Lump, 63,947; nut, 13,600; run of mines, 1,240; slack, 6,725; mixed lump and nut, 34,591. Total, 120,103.

Employes for year ending June 30, 1892: Maximum, inside, 55; outside, 5. Average, inside, 35; outside, 5.

See Inspection Notice No. 312.

## OHIO COUNTY.

No. 9 is the coal wrought for commercial purposes in this county, except at the mines in the regions about Deaneville and Fordsville. At the latter places lower coals, as shown in the sections on Plate II, are worked.

Output in bushels for six months ending December 31, 1891: Lump, 1,884,117; nut, 478,434; run of mines, 357,702; slack, 298,518; mixed lump and nut, 1,180,857; pea, 218,824; slack and nut, 2,700. Total, 4,421,152.



Output in bushels for six months ending June 30, 1892: Lump, 1,605,893; nut, 392,287; run of mines, 368,489; slack, 258,680; mixed lump and nut, 942,964; pea, 154,632. Total, 3,722,945.

Employes for year ending June 30, 1892: Maximum, inside, 681; outside, 109. Total, 790. Average, inside, 546; outside, 75. Total, 621.

#### DEANEFIELD MINE.

At Deane field.

P. O. Ætnaville.

During the statistical year the mine was operated by Guy-M. Deane & Co., address, Owensboro. It is now operated by D. Stewart Miller, Lessee, under the name of the Ætnaville Colliery, he having assumed control on July 13th.

Output in bushels for six months ending December 31, 1891: Lump, 141,271; nut, 23,350; run of mines, 26,563; slack, 31,000. Total, 222,184.

Output in bushels for six months ending June 30, 1892: Lump, 108,952; nut, 21,616; run of mines, 26,216; slack, 26,000. Total, 182,784.

Employes for year ending June 30, 1892: Maximum, inside, 47; outside, 7. Total, 54. Average, inside, 20; outside, 4. Total, 24.

About the only special improvement made during the year was the equipment of the mine with pipes and siphons to secure drainage.

#### THE WORRELL MOUNTAIN MINE.

This mine, opened by Hon. R. S. Triplett, at Reynolds Station, was leased, in March or April, to Mr. J. H. Allen, for one year. He operated it for a month or two, and then suspended work. Conflicting statements are made as to the cause of suspension.

#### THE JOSEPHINE COLLIERY.

This is a new mine, at Reynolds Station, operated by C. B. Sanders, under the name, Reynolds Coal and Coke Co.; A. D. Powers, Superintendent.

The work of opening was commenced May 26, last, and the first shipment was made September 10th. The coal ranges from

36 to 44 inches in thickness ; average thickness, 40 inches. Persons employed : Inside, 18 ; outside, 6.

#### McHENRY MINE.

At McHenry.

P. O. McHenry.

Operated by the McHenry Coal Co., W. G. Duncan, President and Treasurer ; C. W. Taylor, Secretary and Superintendent ; Robert Duncan, Mine Foreman.

Output in bushels for six months ending December 31, 1891 : Lump, 460,312 ; nut, 107,501 ; run of mines, 250,751 ; slack, 40,908 ; mixed lump and nut, 621,963 ; pea, 80,699. Total, 1,562,134.

Output in bushels for six months ending June 30, 1892 : Lump, 319,465 ; nut, 78,949 ; run of mines, 258,278 ; slack, 23,226 ; mixed lump and nut, 422,370 ; pea, 44,382. Total, 1,146,670.

Employes for year ending June 30, 1892 : Maximum, inside, 205 ; outside, 21. Total, 226. Average, inside, 192 ; outside, 21. Total, 213.

During the year twelve new engine shoots were built, and the rope-haulage was extended. See Notices 268 and 321.

#### ECHOLS MINE.

At Echols.

P. O. Echols.

Operated by the McHenry Coal Co. (see preceding), William Williamson, Mine Foreman.

Output in bushels for six months ending December 31, 1891 : Lump, 111,248 ; nut, 34,858 ; slack, 22,660 ; mixed lump and nut, 133,319. Total, 302,085.

Output in bushels for six months ending June 30, 1892 : Lump, 96,206 ; nut, 24,922 ; slack, 3,259 ; mixed lump and nut, 150,061. Total, 274,448.

Employes for year ending June 30, 1892 : Maximum, inside, 80 ; outside, 6. Total, 86. Average, inside, 65 ; outside, 6. Total, 71.

During the year, forty bank-cars have been added to the equipment, and the mine has been materially improved. See Notice 322.

## TAYLOR MINES.

Near Beaver Dam.

P. O. Taylor Mines.

Operated by the Taylor Coal Co., of Kentucky, J. B. Speed, President; W. A. Jones, Secretary and Treasurer; I. P. Barnard, Superintendent. Head office, 415 West Jefferson street, Louisville, Ky.

Output in bushels for six months ending December 31, 1891: Lump, 709,890; nut, 214,375; slack, 40,500; mixed lump and nut, 181,500; pea, 138,125. Total, 1,284,390.

Output in bushels for six months ending June 30, 1892: Lump, 517,299; nut, 149,625; slack, 35,625; mixed lump and nut, 214,750; pea, 110,250. Total, 1,027,549.

Employes for year ending June 30, 1892: Maximum, inside, 158; outside, 30. Total, 188. Average, inside, 108; outside, 20. Total, 128.

During the year the company built twenty-six new houses at the mines. See Notice 318.

## RENDER MINE.

At Hamilton.

P. O. McHenry.

Operated by the Central Coal and Iron Co., B. duPont, President; Thos. J. Tapp, Vice-President; Bannen Coleman, Secretary and Treasurer; T. C. duPont, Superintendent. Head office, Louisville, Ky.

Output in bushels for six months ending December 31, 1891: Lump, 453,996; nut, 98,350; run of mines, 80,388; slack, 156,425; mixed lump and nut, 149,525. Total, 938,684.

Output in bushels for six months ending June 30, 1892: Lump, 538,459; nut, 110,675; run of mines, 57,500; slack, 165,700; mixed lump and nut, 83,000. Total, 955,334.

Employes for year ending June 30, 1892: Maximum, inside, 140; outside, 15. Total, 155. Average, inside, 118; outside, 10. Total, 128.

During the year the Company put in twenty tons of 25-lb. rail, and started a new opening. See Notice 319.

## WILLIAMS MINE.

Near McHenry.

P. O. McHenry.

Operated by the Williams Coal Co., J. S. Williams, President; K. V. Williams, Secretary; J. W. Cooper, Treasurer.

This is a new mine, the first shipments from which were made in the early part of the present year.

Output in bushels for the six months ending June 30, 1892: Lump, 4,012; nut, 500; run of mines, 26,495; mixed lump and nut, 1,293. Total, 32,300.

Employes for year ending June 30, 1892: Maximum, inside, 17; outside, 25. Total, 42. Average, inside, 17; outside, 10. Total, 27.

When visited in September the mine was not in operation, on account of work being done at the hoisting engine—the mine being entered by a slope—but a favorable impression was made by the appearance of the bank so far as developed. See Notice 320.

## THE GAINES MINES.

Near Fordsville.

P. O. Fordsville.

Operated by W. S. Gaines and W. O. Read.

Output in bushels for six months ending December 31, 1891: Mixed lump and nut, 94,550; slack, 7,025. Total, 101,575.

Output in bushels for six months ending June 30, 1892: Mixed lump and nut, 71,490; slack, 4,570. Total, 76,060.

Employes for year ending June 30, 1892: Maximum, inside, 24; outside, 3. Average, inside, 16; outside, 2.

Although several attempts were made to reach these mines, circumstances prevented their examination within the inspection year. Messrs. Gaines and Read report that during the year they enlarged the air-shaft and topped it with a new stack, higher than the former one, in accordance with suggestions previously made by the Inspector, and that they have put in a new tipple and standard screens.

## UNION COUNTY.

Coals No. 5, No. 6, No. 9 and No. 11, of Owen's scale, furnish the commercial product of this county. (No. 1 B is worked in Crittenden, just across the county line.)

Output in bushels for six months ending December 31, 1891 : Lump, 453,813 ; nut, 139,101 ; run of mines, 298,228 ; slack, 7,235 ; mixed lump and nut, 8,050 ; pea, 62,095. Total, 968,522.

Output in bushels for six months ending June 30, 1892 : Lump, 522,784 ; nut, 179,829 ; run of mines, 282,823 ; slack, 28,556 ; pea, 80,940. Total, 1,094,932.

Employes for year ending June 30, 1892 : Maximum, inside, 194 ; outside, 114. Total, 308. Average, inside, 132 ; outside, 97. Total, 229.

#### DAVIDSON'S MINE.

Near Uniontown.

P. O. Uniontown.

Operated by Ben C. Davidson & Son.

Output in bushels for six months ending December 31, 1891 : Lump, 67,474 ; nut, 7,904. Total, 75,378.

Output in bushels for six months ending June 30, 1892 : Lump, 50,384 ; nut, 6,495. Total, 56,879.

Employes during year ending June 30, 1892 : Maximum, inside, 10 ; outside, 6. Average, inside, 5 ; outside, 3.

The coal wrought here is No. 11. Circumstances prevented the examination of the mine within the inspection year. During the year safety-catches were provided for the cages, in accordance with previous directions of the Inspector. This mine has but one outlet.

#### THE DEKOVEN MINES.

At DeKoven.

P. O. DeKoven.

Operated by the Ohio Valley Coal and Mining Co., S. S. Brown, President ; S. P. Sturgis, Secretary ; N. M. Jones, Treasurer ; John Whitehead, Mine Superintendent.

Output in bushels for six months ending December 31, 1891 : Lump, 302,038 ; nut, 96,707 ; run of mines, 296,698 ; slack, 6,935 ; mixed lump and nut, 8,050 ; pea, 54,810. Total, 765,238.

Output in bushels for six months ending June 30, 1892 : Lump, 346,922 ; nut, 111,961 ; run of mines, 218,244 ; pea, 80,940. Total, 758,067.

Employes for year ending June 30, 1892 : Maximum, inside, 127 ; outside, 78. Total, 205. Average, inside, 78 ; outside, 75. Total, 150.

There are three mines here, all slopes. Two are opened by a single slope, and are respectively in No. 5 and No. 6 coals. The third is in No. 9. The latter mine was opened within the statistical year. A large tipple is under construction at the latter mine, railroad tracks have been laid to handle the product, and preparations for building ten coke ovens are under way. The slope of the No. 9 Mine is now protected by wooden "timbering" and lagging. These will, in time, probably be replaced by stone. The furnace at this mine should have cold-air passages at the sides. A very commendable thing in connection with it is the lining of the upcast shaft with brick. No. 8 coal crops out in the hill near this mine, and is present in the well by the engine house. See Notices 300, 301 and 302.

#### THE WARDLAW MINE.

Near Sturgis.

P. O. Sturgis.

Operated by the Cumberland Coal Co., W. W. Smith, President; Isaac Reese, Secretary and Treasurer. Head office, Nashville, Tennessee, J. C. Wardlaw, Superintendent of Mines.

Output in bushels for six months ending December 31, 1891: Lump, 48,735; nut, 15,007; pea, 7,285. Total, 71,027.

Output in bushels for six months ending June 30, 1892: Lump, 41,229; nut, 20,157; run of mines, 24,479; slack, 14,000. Total, 99,865.

Employes for year ending June 30, 1892: Maximum, inside, 12; outside, 10. Average, inside, 8; outside, 2.

The coal worked is No. 9. During the year a steam pump has been added to the equipment; a spur from the Ohio Valley Railroad has been built to the mine, 60-ton track-scales have been put in, and a new tipple has been built. See Notice 299.

#### THE STURGIS MINE.

Near Sturgis.

P. O. Sturgis.

Operated by the Sturgis Coal and Coke Co., F. C. Mills, President; Aaron Kohn, Vice-President; Moses Schwartz, Treasurer; Geo. H. McCartney, Secretary and General Manager.

Statistics of output for the last half of 1891, refer to the output of the "Tate Slope."

Output in bushels for six months ending December 31, 1891:

Lump, 3,700; nut, 8,840; run of mines, 1,580; slack, 300. Total, 14,370.

Output in bushels for six months ending June 30, 1892: Lump, 69,035; nut, 36,331; run of mines, 40,100; slack, 14,556. Total, 160,022.

The larger part of the output for the first half of the present year was produced by the new shaft-mine, the first shipments from which were made in March.

Employees for year ending June 30, 1892: Maximum, inside, 38; outside, 18. Total, 56. Average, inside, 35; outside, 15. Total, 50.

Work at the Tate Slope has been suspended. The tippie at the Sturgis Shaft is equipped with the Russell & Parson automatic self-dumping cages. The engine house is equipped with one Webster, Camp & Lane double hoisting engine, and one Ingersoll-Sergeant air-compressor. Four Sergeant mining machines are used, and two Jeffrey air-drills. The mine is provided with one Cameron pump, 5-inch suction, and one pump having 3-inch suction. Coal No. 9 is the one worked. See Notice 298.

#### THE LAYMAN MINE.

This mine, located near Sturgis, was purchased by the Sturgis Coal and Coke Co., in the Spring of 1892, and was shut down.

Output in bushels for six months ending December 31, 1891: Lump, 31,866; nut, 10,643. Total, 42,509.

Output in bushels for the six months (producing four months) ending June 30, 1892: Lump, 15,214; nut, 4,885. Total, 20,099.

Employees for year ending June 30, 1892: Maximum, inside, 7; outside, 2. Average, inside, 6; outside, 2.

#### WEBSTER COUNTY.

Only one company produces commercial coal. It has two mines, known as

#### THE PROVIDENCE No. 1 AND No. 2 MINES.

At Providence.

P. O. Providence.

Operated by the Providence Coal Co., E. B. Hayden, President; W. L. Barnes, Secretary.

Output in bushels for six months ending December 31, 1891 :  
Lump, 246,770 ; nut, 91,272 ; run of mines, 80,102 ; pea, 49,925.  
Total, 468,069.

Output in bushels for six months ending June 30, 1892 : Lump,  
164,498 ; nut, 50,065 ; run of mines, 56,552 ; slack, 22,750 ; mixed  
lump and nut, 23,077 ; pea, 20,244 ; miscellaneous, 1,450. Total,  
338,636.

Employes for year ending June 30, 1892 : Maximum, inside,  
95 ; outside, 30. Total, 125. Average, inside, 65 ; outside, 20.  
Total, 85.

No special outside improvements have been made during the  
year. See Notices 323 and 324.















